Metals Review
THE NEWS DIGEST MAGAZINE

Volume XXV - No. 11 November, 1952

NEUTRAL SALT BATHS CONTAINING ADDITIVES WHICH ELIMINATE RECTIFICATION

PRODUCT	Melting Point	Operating Temperature Range
HARDENING 185-10 (Granular)	820°F.	1000-1500°F.

A Neutral Hardening Bath having a specific weight of 135 lbs. per cubic foot at 1500° F. (2.17 sp. gr.); specific heat 0.208 at 1050° F.

HARDENING 127-11 and 127-12 (Granular)	1110°F.	1300-1650°F.

A water soluble neutral hardening bath having a specific weight of 110 lbs. per cubic foot at 1550° F. (1.70 sp. gr.); specific heat 0.165 at 1275° F.

HARD BRITE AA-10 (Granular)	1380°F.	1450-2000°F.

A Neutral Hardening Bath for higher temperature work, having a specific weight of 1.57 lbs. per cubic foot at 1850° F. (2.43 sp. gr.); specific heat 0.169 at 1550° F.

HIGH SPEED PREHEAT 13-17-10 (Granular)	1040°F.	1200-1700°F.

A Neutral Salt Bath for tool steels, high speed steels, high carbon high chrome or air hardening steels having a specific weight of 140 lbs. per cubic foot at 1500° F. (Approx. 2.20 sp. gr.); specific heat 0.170 at 1500° F.

HIGH SPEED 17-24 AA-10 (Granular)	1700°F.	1750-2350°F.

A new Salt Bath for high speed hardening which requires no rectifier for maintaining neutrality.

Specific weight 160 lbs. per cubic foot at 2000° F. (2.651 sp. gr.); specific heat 0.159 at 1850° F.

THE A. F. HOLDEN COMPANY

P. O. Box 1898, New Haven 8, Conn. 11300 Schaefer Highway, Detroit 27, Michigan

Metals Review

THE NEWS DIGEST MAGAZINE

VOLUME XXV, No. 11 NOVEMBER, 1952

MARJORIE R. HYSLOP, Editor
BETTY A. BRYAN, Associate Editor
RAY T. BAYLESS, Publishing Director
GEORGE H. LOUGHNER, Production Manager
A. P. FORD, Advertising Manager

• • •

DISTRICT MANAGERS

Donald J. Billings
7301 Euclid Ave., Cleveland 3, Ohio
UTah 1-0200

John F. Tyrrell
John B. Verrier, Jr.
55 West 42nd St., New York 36
CHickering 4-2713

Ralph H. Cronwell,
482 Burton Ave, Highland Park, Ill.
HIghland Park 2-4263

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Metal Show Sets New Standards

New Methods in Decoration and Display Exploited

Emphasis on Basic Science and Education Seen in All Congress Activities

NEITHER word nor picture can adequately convey the visual impact of this year's National Metal Exposition in Philadelphia Oct. 20 through 24. In all likelihood, the year 1952 will go down in history as the date when the Metal Show became really a "show"—the date when its decorative possibilities began to be exploited on the grand scale. This applies not only to the decoration of the hall itself, where metal art is beginning to replace the traditional banners and bunting, but also to the individual booths of the exhibitors. No longer is a booth a rectangular section marked off by siderails and drab drapery, with a few signs, samples and settees. In the 1952 Show one booth blended into another in spectacular examples of commercial display art. Operating pieces of heavy equipment dolled up in color and paint performed their usually workaday jobs in sparkling cleanliness. Skillful placing and spacing of exhibit material led the visitor unconsciously into the exhibit space, while royally carpeted aisles softened the foot-punishing drudgery of the 2-mile circuit.

Business As Usual

But beauty did not detract from business, as witnessed the "sold" signs liberally plastered on furnaces, plating tanks, testing machines and metal fabricating tools of innumerable variety. By the final day of the Show, seven duplicates of one floor model heat treating furnace had been ordered—maybe more, for there was no space left on the sides of the equipment for additional signs. Many exhibitors boasted that they had retrieved their entire exhibiting expense in sales made, with profit to spare. This, despite the constant press of customers and interested engineers surrounding every exhibit.

Attendance figures were up 5% over last year, for a total of 43,301 registrations and 78,863 clocked attendance. So great was the increase that exhibitors ran out of handout material and air mail replacements arrived daily. All of the electric power these well-equipped exhibit halls could supply was in use and more capacity would have eased the load. Despite such few minor inconveniences, the general satisfaction of exhibitors and visitors alike was a tribute to the efficient coordination and management that resulted in a smooth-running show.

Young Engineers Day

Other new aspects of the Metal Congress were equally as important as the new dress and new developments seen at the Exposition. The theme of "Metals Keep the Peace" was reflected in the emphasis on new metals and materials, labor and time-saving processes described in the technical sessions as well as exhibited at the Show.

Also underlying all of the discussions, ranging from formal meetings to personal contacts, was a new emphasis on the importance of basic science and education. America's crucial need for replenishing her supply of trained metals engineers was a matter of serious consideration on all sides. An intangible but vital impetus toward solving the problem was provided by the designation of Friday, Oct. 24, as "Young Engineers Day". On that date 1974 technical students from 25 engineering schools and colleges within 150 miles of Philadelphia were transported to the Show by chartered buses. All day they were allowed to roam at will through the Show, questioning exhibitors and witnessing the career possibilities offered by the metal industry; transportation to the Show and luncheon for the students were provided by courtesy of the American Society for Metals. The list of schools represented was as follows:

Brooklyn Polytechnic Institute
Catholic University of America
City College of New York
Columbia University
Drexel Institute of Technology
George Washington University
Lafayette College
Lehigh University
Johns Hopkins University
Manhattan College
Newark College of Engineering
New York University
Pennsylvania State College
Pratt Institute
Princeton University
Rutgers University
Swarthmore College
St. Joseph's College
Stevens Institute of Technology
Temple University
University of Delaware
University of Maryland
University of Pennsylvania
University of Virginia
U. S. Naval Academy
Villanova College

The support of basic science and research was the object of one of the most important actions ever taken by the American Society for Metals, when, at its annual meeting on Wednesday, Oct. 22, the unanimous vote of the members was cast for the establishment of the A.S.M. Foundation for Education and Research. This endowment of more than a half million dollars ($650,000) was described in detail in the September issue of *Metals Review*.

Awards

Also at the annual meeting three $2000 teaching awards were presented to young professors. Winners of the first of these annual awards were Joseph W. Spretnak, associate professor of metallurgy at Ohio State University; Arthur A. Burr, associate professor of metallurgical engineering at Rensselaer Polytechnic Institute; and Robert D. Stout, profes-

Cleo F. Craig, President of American Telephone and Telegraph Co., Accepts the A. S. M. Research Medal From President Chipman

Walter E. Jominy, President of the Foundation for Education and Research, accepts $650,000 in Securities From Secretary Eisenman

sor in the department of metallurgy at Lehigh University.

Yet another step to further engineering education was the announcement in the President's annual report of the program of Science Achievement Awards for Junior & Senior High School students, sponsored by the American Society for Metals and conducted by the National Science Teachers Association. This program is intended to reach students from the 7th through the 12th grades of high school, and interest them in a career in science and engineering. A typical example of one of the winning papers in the 1952 program is printed on page 12 of this issue.

Annual Banquet

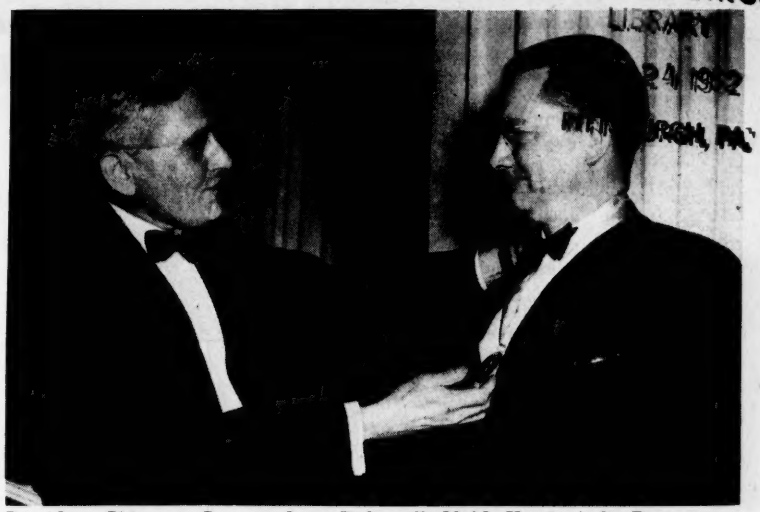
This theme was repeated again at the annual banquet of the American Society for Metals, when John C. Warner, president of Carnegie Institute of Technology, spoke on "Freedom, Scholarship and Centers of Learning". Dr. Warner voiced a strong plea for the support of the country's engineering institutes and colleges by "free" money contributed without strings attached, as contrasted to support by government funds and similar group monies which require direction of research toward a definite achievement or project. Only by giving the scholar a free rein to follow undirected lines of fundamental research resulting in new ideas and comprehensive theories can we continue as a free nation, the speaker maintained.

The usual program of honors preceded Dr. Warner's address at the banquet. As announced in the September issue of *Metals Review*, the Gold Medal of the A.S.M. was presented to Robert F. Mehl, the Medal for the Advancement of Research to Cleo F. Craig, and an honorary membership was conferred in absentia on C. H. Desch of England. The Albert Sauveur Achievement Award, not previously announced, was presented to A.S.M. President John Chipman, head of the department of metallurgy at Massachusetts Institute of Technology, by action of the committee of past presidents responsible for selection of the candidate. Presentation was made by Albert E. White, first president of the American Society for Steel Treating.

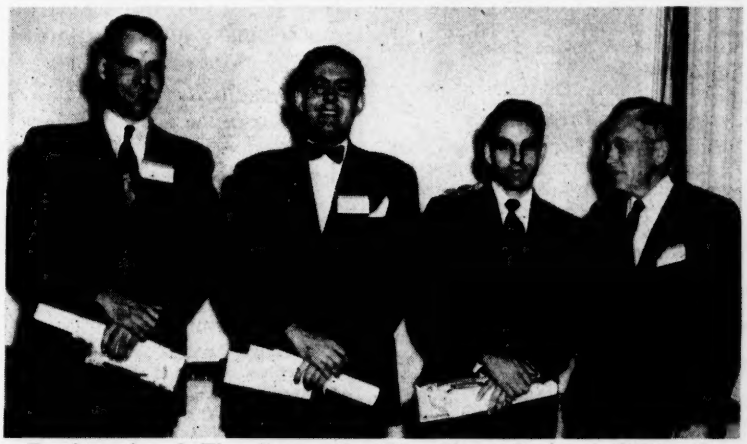
Cooperating Societies

Technical sessions of the various cooperating societies drew large and interested audiences. The opening event on the A.S.M. program, the Saturday and Sunday Seminar on Modern Research Techniques in Physical Metallurgy, held a continuing audience of about 450 for the five sessions. Particularly noteworthy among the topics covered was the

(*Continued on p.* 6)



President Chipman Congratulates Robert F. Mehl, Head of the Department of Metallurgy at Carnegie Tech, on Award of the Gold Medal



Teaching Awards Were Presented to Three Young Professors During the A. S. M. Annual Meeting. From left are Arthur A. Burr of Rensselaer Polytechnic Institute, Joseph W. Spretnak of Ohio State University and Robert D. Stout of Lehigh University; President Chipman at right

Some 800 A.S.M. Members and Guests Attended the Annual Meeting and Campbell Memorial Lecture on Wednesday Morning, Oct. 24

Metal Show *(continued)*

demonstration lecture on electron emission studies—a new tool destined for important metallurgical applications. The papers presented at the seminar, as well as those constituting the three lecture courses, will be published in book form during the ensuing year.

Cyril Stanley Smith's Campbell Memorial Lecture on "Microstructure", presented immediately after the A.S.M. annual meeting on Wednesday morning, developed some of the conclusions and results of his famous "soap bubble" studies. It will be published in extended abstract in the December issue of *Metal Progress,* and in full in the annual volume of the *Transactions.*

Programs of the other technical societies proved equally popular, as will be reported in the journals and publications of the American Welding Society, the Institute of Metals Division of the A.I.M.E., the Society for Non-Destructive Testing and the Metals Section of the Special Libraries Association.

Borg-Warner Buys Atkins

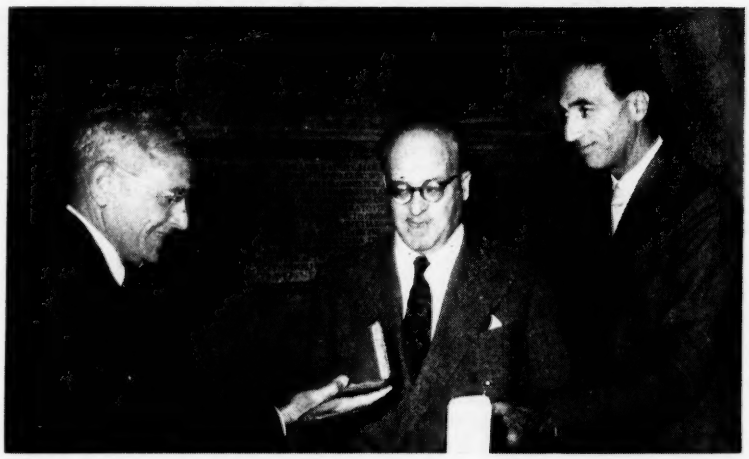
Borg-Warner Corp., Chicago, has acquired E. C. Atkins and Co., Indianapolis, century-old saw manufacturing concern. The company will be operated as the Atkins Division of Borg-Warner. With the change in ownership of the company, Indianapolis becomes a key city in the Borg-Warner.

With the change in ownership of the company, Indianapolis becomes a key city in the Borg-Warner group of 28 manufacturing plants and specialty steel mills in 23 strategically located cities throughout the United States.

Gavel Changes Hands

E. F. Houghton, Left, Outgoing Chairman of the Indianapolis Chapter, Presents the Gavel to C. O. Sundberg, Diamond Chain Co., Incoming Chairman for the 1952-53 season, at the May meeting of the Chapter

Chipman Honored in Italy



Aldo Dacco', President of the Italian Metallurgist Association, is Shown Handing to John Chipman, Past President of the American Society for Metals, the Losana Gold Medal, Highest Italian Award in the Metallurgical Field, Assigned to Him for the High Contribution he Has Made to the Science of Metallurgy. In the middle is Minister for the Italian Trade Navy, Paolo Cappa. The ceremony took place at Genoa in the famous "Palazzo San Giorgio" which dates from 1300

John Chipman, past president of the American Society for Metals, and recipient of the Albert Sauveur Achievement Award at the annual banquet in October, received the Losana Gold Medal, the highest Italian award in the metallurgical field, in Genoa in September.

The Luigi Losana Foundation of Italy which awarded the medal to Dr. Chipman, was founded to honor the memory of the Italian researcher, educator, and technician, Luigi Losana. The aim of the Foundation is to promote, by the awarding of the medal, and by other means, the study of those disciplines advocated by Prof. Losana. The medal is awarded every other year to the scientist who has contributed most to the knowledge of metals. The Board of Council of the Foundation designates the country whose scientist shall be chosen, the recipient of the award.

The following letter is from Aldo Dacco', president of the Italian Metallurgist Association, who bestowed the medal on Dr. Chipman.

"No doubt Dr. Chipman has already told you about the days he spent in Italy and the welcome he has had from Italian metallurgists. The delivery of the Losana Medal has taken place in the most solemn form, which is fitting both for the importance of the highest metallurgical award and for the scientist to whom it has been conferred. I trust that this circumstance has contributed to strengthen the connections between Italian and American metallurgists . . . "

The first Losana Medal was awarded to Prof. Georges Chaudron from France two years ago.

Enos of Purdue Dies Suddenly

George Magee Enos, professor of physical metallurgy on the Purdue University faculty, and a member of the A. S. M. Educational Committee, died unexpectedly on Oct. 27

in Lafayette, Ind. He was 56 years old. Dr. Enos was a 25-year member of the A. S. M., and a charter member of the Purdue Chapter.

Widely known and recognized in the metallurgical field, Dr. Enos has been on the Purdue staff since 1946. He was awarded his B. S. degree from the South Dakota School of Mines, his M. S. degree from Massachusetts Institute of Technology, and his Ph. D. degree from Carnegie Institute of Technology. Dr. Enos saw service in both world wars, and went to Purdue after leaving the Army for the second time. He had previously taught at the University of Cincinnati.

He was a member of numerous honorary and technical societies, and has written numerous textbooks and scientific treatises.

Winners in A. S. M. Metallographic Exhibit

National Metal Exposition, Philadelphia, Oct. 20-24, 1952

Best in Show

Grand Prize of $100

H. Griffin

Sperry Gyroscope Co.

Great Neck, Long Island, N. Y.

"Various Cu-Zn Phases in Zn-Cu Duplex Ingot"

Stainless and Heat Resisting Steels

Best in Class: Roy L. Anderson, Westinghouse Research Laboratories, East Pittsburgh, Pa.—"Weld Nugget Structure".

Honorable Mention: Roy L. Anderson, Westinghouse Research Laboratories, East Pittsburgh, Pa.—"Cracks in Cast Stainless Steels Resulting From Strauss Test".

Honorable Mention: Bengt Soderlund, Sandvik Steel Works, Sandviken, Sweden—"Damage From Burr From Edge Rolled Into Stainless Steel Strip."

Other Steels and Irons

Best in Class: A. Schrader, Max-Planck-Institut fur Eisenforschung, Dusseldorf, Germany—"Light and Electron Micros of Steel Showing Various Stages in Isothermal Transformation of Medium-Carbon Steel".

Honorable Mention: Bengt Soderlund, Sandvik Steel Works, Sandviken, Sweden—"Group of Four Showing Microstructure of Test Ingot From First Bessemer Steel Heat Made in Sweden (1858)".

Series Showing Transitions or Changes During Processing

Best in Class: W. Koch and H. Rohde, Max-Planck-Institut fur Eisenforschung, Dusseldorf, Germany—"Series of Six Electron Micros of Electrolytically Isolated Carbides Showing Genesis and Growth of Chromium Carbide in 0.35 to 3½% Cr Steel".

Honorable Mention: Cornelius A. Johnson, Metals Research Department, Armour Research Foundation of Illinois Institute of Technology, Chicago.—"Group of Ten Micros Showing Isothermal $\beta \rightarrow \alpha + \beta$ Transformation at 700° C., in Titanium Alloys With 7% and 9% Mo".
on Tempering".

Honorable Mention: Bernard S. Lement and Miriam Yoffa, Massachusetts Institute of Technology, Cambridge 39, Mass.—"Electron Micrographs of a 1.4% C Steel Illustrating the Microstructural Changes on Tempering".

Aluminum, Magnesium, Beryllium, Titanium, and Their Alloys

Best in Class: Laboratory of Carl A. Zapffe, Baltimore, Md.— "Fingerprints of Fatigue—Fractograph of 75S-T6 Aluminum Alloy Broken in Fatigue at 25,000 Psi.".

Honorable Mention: Daniel Pribila, Wright Aeronautical Div., Curtiss-Wright Corp., Wood-Ridge, N. J.—"Group of 12 Micros Showing Structures Along End-Quenched Bars of Three Commercial Titanium Alloys"

Honorable Mention: R. D. Buchheit, G. A. Wheeler and G. A. Lenning, Battelle Memorial Institute, Columbus, Ohio—"Group of Eight Micros Showing Iodide Titanium With Various Amounts of Hydrogen".

Metals and Alloys Not Otherwise Classified

Best in Class: William C. Coons, Climax Molybdenum Co. of Michigan, Detroit—"Seven Micros of Vacuum Arc-Cast Molybdenum Sheet (as Rolled) and Recrystallized at Various High Temperatures".

Honorable Mention: Cornelius A. Johnson, Metals Research Department, Armour Research Foundation of Illinois Institute of Technology, Chicago—"Structure of 62% Cu, 38% Zr Alloy as Cast and as Annealed for 350 Hr."

Toolsteels and Tool Alloys

Honorable Mention: W. L. Grube, S. R. Rouze and T. R. McKinney, Research Laboratories Division, General Motors Corp., Detroit — "Electron Micrograph at 15,000X in Color of Cemented Alloy Carbide Tool".

Copper, Zinc, Lead, Nickel, and Their Alloys

Best in Class: H. Griffin, Sperry Gyroscope Co. (See Best in Show, above.)

Honorable Mention: Laboratory of Carl A. Zapffe, Baltimore, Md.— "Deformation and Fracture in Cast Zinc".

Surface Phenomena

Best in Class: Bengt Soderlund, Sandvik Steel Works, Sandviken, Sweden—"Blue Tempered Edge in Cr-Mo Steel Roll Due to Faulty Coarse Grinding".

Honorable Mention: H. J. Huff, Aluminium Laboratories, Ltd., Kingston, Ont., Canada—"Stereoscopic (Three-Dimensional) Electron Micros Showing Oxide Films in Pits Corroded in 2S Alloy by Tap Water".

Results by Unconventional Techniques

Best in Class: George C. Towe, Engineering Research Institute, University of Michigan, Ann Arbor, Mich.—"Group of Six Autoradiographs of Carbon Steel Containing Radiographic C_{14}".

Honorable Mention: Francis M. Krill, Kaiser Aluminum and Chemical Corp., Spokane, Wash.—"Luder Lines in 52S Aluminum Sheet, Polished and Stretched; Photographed Full Size by Reflected Light Without Lens".

Honorable Mention: W. M. Williams, Institute for the Study of Metals, University of Chicago—"Stereoscopic Pair Showing the Grain Structure (in Three Dimensions) of 5% Sn, 95% Al".

Honorable Mention: M. Lauriente, Aberdeen Proving Ground, Md.—"Deformation Phenomena on Primary Cleavage Plane of Cast Zinc".

Slags, Oxides and Inclusions

Best in Class: Research and Development Laboratory, United States Steel Co., Pittsburgh—"Group of Photographs in Color, 1X and 100X, Showing Changes in Structure of Silica Brick From Openhearth Roof After 70 Heats".

Honorable Mention: R. G. Wells, Research and Development Laboratory, United States Steel Co., Pittsburgh—"Electric Furnace Oxidizing Slag, 300X, Showing Minerals Chrome Spinel and Merwinite".

Student Division

Best in Class: Rudi Jonck, Institute of Technology, Technical University of Berlin-Charlottenburg, Germany—"Group of Three Micros Showing Hardened Cast Iron".

The Grand Prize, which was awarded to H. Griffin, of Sperry Gyroscope Co., Great Neck, Long Island, for the entry "Various Cu-Zn Phases in Zn-Cu Duplex Ingot" consisted of an engrossed certificate, and a money award of $100. The first prize of a medal and blue ribbon was awarded to the best entry in each classification. The winner of the student exhibit received a bronze medal and $25 cash, and each honorable mention was awarded a ribbon and $10 cash.

New International Journal for Metal Science Makes First Appearance in Jan.

A new international journal for the science of metals will make its first appearance in January 1953. It was initiated and is sponsored by the American Society for Metals, and will be known as *Acta Metallurgica.*

The purpose of the new journal is to provide a medium for the publication of papers describing theoretical and experimental investigations covering properties and behavior of metals in terms of fundamental particles, forces and energies. It will include original papers, letters to the editor, book reviews, and occasional review articles. It is expected that *Acta Metallurgica* will consist of about 750 pages a year. Suitable papers will be published in the original language, with summaries in French, German and English.

In addition to A.S.M., the following societies are cooperating in the publication of *Acta Metallurgica:*

American Institute of Mining and Metallurgical Engineers
American Institute of Physics
Associacao Brasileira de Metais (Brazil)
Associazione Italiana di Metallurgia (Italy)
The Chemical Society (England)
Deutsche Gesellschaft fuer Metallkunde (Germany)
Indian Institute of Metals
Institute of Metals (England)
Instituto del Hierro y del Acero (Spain)
Iron and Steel Institute (England)
Metallografiska Institutet (Sweden)
Physical Society of Finland
Societa Francaise de Metallurgie (France)
Verein Deutscher Eisenhuttenleute (Germany)

The sponsoring societies support the journal financially and their representatives will have membership on the board of governors that establishes the policy for the journal. At present, the only sponsoring society is the American Society for Metals.

Cooperating societies assist in the mechanics of obtaining subscriptions for the journal, and from their representatives certain members of the board of governors will be selected. Additional sponsoring and cooperating societies are welcome, and it is expected that others will support the new journal in the future.

The present board of governors consists of Cyril S. Smith, chairman; Amos J. Shaler, vice-chairman; J. H. Hollomon, secretary-treasurer; Frederick Seitz, James B. Austin, M. Gensamer, E. Rudberg, U. Dehliger, and a British representative to replace Sir William Griffiths, recently deceased.

The business management is being undertaken by the American Institute of Physics. Printing will be done at the University of Toronto Press.

The editor is Prof. Bruce Chalmers of the University of Toronto, and he will be advised and assisted by the following associate editors in various countries: Harvey Brooks (North America), Alan Cottrell (United Kingdom), P. Laurent (France), P. Coheur (Belgium), W. G. Burgers (Holland), G. H. H. Wasserman (Germany), E. Rudberg (Sweden), W. Boas (Australia), and Antonio Scortecci (Italy). Additional associate editors for other areas will be appointed by the editor in the near future.

The cost of subscription is $6 to members of sponsoring societies, $9 to members of cooperating societies, and $12 to individuals who are not members of either. **A.S.M. members should therefore send $6 for a year's subscription to the A.S.M. headquarters (7301 Euclid Ave., Cleveland 3, Ohio);** members of other societies listed above should send $9 to their respective society headquarters; and all others should send $12 for a year's subscription directly to Acta Metallurgica, 57 East 55th St., New York 22, N. Y.

Canton-Massillon Starts Educational Series

The Canton-Massillon Chapter A.S.M. is currently conducting a series of educational lectures on the "Principles of Heat Treatment". The lectures are held at the Timken Vocational High School in Canton, and are open to anyone interested in heat treatment, whether an A.S.M. member or not.

The first class, which was held Oct. 15, featured S. W. Poole, Republic Steel Corp., who gave an "Introduction to Heat Treatment". Subsequent classes are as follows:

Oct. 22—Hardness and Hardenability, by D. Niconoff, Republic Steel Corp.

Oct. 29—Physical Properties, by A. Christianson, Timken Roller Bearing Co.

Nov. 5—Transformation of Austenite, by R. L. Nichols, Timken Roller Bearing Co.

Nov. 12—Case Hardening and Grain Size, by C. Shelton, Tyson Roller Bearing Co.

Nov. 19—Practical Heat Treatment, by G. B. Trumble, Ford Motor Co.

This educational course is presented by the Chapter in order to fulfill the educational aims of the American Society for Metals. A nominal charge of $10 is made for the course. If five of the six lectures of the course are attended, however, the only charge will be $4.00 for the cost of the textbook, "Principles of Heat Treatment", by M. A. Grossman, and the balance will be returned to the individual attending.

Smelting Plant Opened

A modern and up-to-date brass and bronze ingot smelting plant was formally opened on Oct. 14, in El Segundo, Calif., by H. Kramer & Co., Chicago.

The California division of H. Kramer & Co., producer of brass and bronze alloy ingots, includes modern offices and laboratory, and two 60-ton reverberatory furnaces, two rotary-type furnaces, a number of tilting furnaces, a cupola and radiator sweater.

Brass and bronze ingots are produced by utilizing copper and copper-base alloy scrap materials, thus helping conserve natural resources for the United States.

Purdue's 1952-53 Officers

1952-53 Officers of the Purdue Chapter Elected at the May Meeting Are, From Left: V. C. Vanderbilt, Professor at Purdue, and E. G. Ridoux, of Haynes Stellite Co., Executive Committee; C. T. Leaman, Aluminum Co. of America, Secretary-Treasurer; C. R. Anderson, Aluminum Co. of America, Chairman; and T. J. Hughel, of Purdue, Vice-Chairman. Herman Kaiser, well-known golfer and vice-president in charge of golf sales at Hillerich-Bradley Co., presented a discussion on the history and present scope of the game, and demonstrated grips, stands and swings. (Photo by W. F. Bertram)

AMERICAN SOCIETY FOR METALS

EXECUTIVE OFFICES - 7301 EUCLID AVE.

CLEVELAND 3, OHIO

CABLE ADDRESS: "ASM CLEVELAND"

CONFIDENTIAL SESSIONS

REFRACTORY MATERIALS FOR HIGH TEMPERATURES

You are cordially invited to make application to attend the two-day confidential conference on Refractory Materials for High Temperatures to be held under the auspices of the American Society for Metals at the Carter Hotel, Cleveland, Ohio, on

Monday, November 24, 1952
Tuesday, November 25, 1952

This meeting is held to provide an opportunity for the presentation and discussion of classified information that qualified engineers need to know in the performance of their jobs and in the best interests of national defense.

The preliminary program for this meeting is outlined on the next page. The variety of the subjects listed and the high qualifications of the speakers are assurance that the program will be an outstanding success.

This conference, while under the auspices of the ASM, is not limited to ASM members but to all individuals who can comply and who file in advance security qualifications.

Security regulations require that attendance at this meeting must be limited to citizens of the United States who possess evidence of current clearance through "confidential" by the Air Force, Navy, Research and Development Board, Atomic Energy or other credited United States Government agency.

To attend, the application form on p. 11 must be filled out and returned to the ASM headquarters in Cleveland through the military security officer having cognizance over the plant or activity and contract with which you are connected.

Once admission has been secured to the meeting room at the Carter, Security Authorities will require anyone leaving and re-entering to prove his clearance identity. Therefore, it has been arranged that luncheon will be served on Monday and Tuesday in the room adjoining the conference room. However, the meeting will be adjourned for dinner on Monday, between the afternoon and evening sessions. Luncheon will be served on Tuesday after the morning session and before the inspection trip at N.A.C.A.

ENROLLMENT FEE

Enrollment fee will be $10.00. This will include two luncheons and gratuities plus transportation to and from N.A.C.A. Laboratory and the Hotel Carter.

HOTEL RESERVATIONS

Those attending the conference are requested to make their hotel reservations direct with Miss Betty Maus, Reservation Manager, Hotel Carter, 1012 Prospect Avenue, Cleveland 15, Ohio, indicating the type of accommodations required and the date of arrival. The rates are as follows:

SINGLE					TWIN			
$4.00	$5.00	$6.50	$7.00	$7.50	$8.00	$9.00	$10.00	$11.00
DOUBLE					**SUITES**			
$6.00	$7.00	$8.50	$9.00	$9.50		$20.00	$30.00	

SEE PROGRAM NEXT PAGE

ASM Preliminary Program

REFRACTORY TYPE MATERIALS FOR HIGH TEMPERATURE APPLICATIONS

NOVEMBER 24 and 25, 1952

MORNING SESSION - NOVEMBER 24
(9:30 A.M. - 12:00 Noon)

Main Subject: *Molybdenum and Its Alloys*

Arc Cast Molybdenum and Molybdenum-Base Alloys—Their Manufacture, Fabrication and Properties—R. M. Parke, General Electric Co. (10 min.)

Sintered Molybdenum and Molybdenum-Base Alloys—Their Manufacture, Fabrication and Properties—By Howard Scott, Westinghouse Electric Co. (10 min.)

Related Discussion (5 min. each)

(a) L. F. YNTEMA, Fansteel Metallurgical Corp.
(b) H. HANICK, Wright Aeronautical Co.
(c) K. DIKE, NACA

Panel Session on Above Subjects* (30 Minutes)

The Elevated Temperature Properties of Molybdenum and Molybdenum-Base Alloys—By Howard Cross, Battelle Memorial Institute. (10 min.)

Protective Coatings for Molybdenum or Molybdenum-Base Alloys—By Ralph Wehrmann, Fansteel Met. Corp. (15 min.)

Related Discussion (5 min. each)

(a) K. M. BARTLETT, Thompson Products, Inc.
(b) D. G. MOORE, Bureau of Standards
(c) R. I. JAFFEE, Battelle Memorial—(Cladding)

Panel Session on Above Subjects* (30 Minutes)

— Recess 12:00 o'clock —

AFTERNOON SESSION - NOVEMBER 24
(1:30 - 5:00 P.M.)

Main Subject: *Ceramics and Intermetallics*

Ceramic Bodies for Use at Elevated Temperatures and Their Evaluations—By R. F. Geller, Bureau of Standards. (15 min.)

Related Discussion (5 min. each)

(a) F. K. DAVEY, Rutgers University
(b) G. M. BUTLER, Carborundum Co., or staff member
(c) TOM SHEVLIN, Ohio State University
(d) S. H. STUPAKOFF, Stupakoff Ceramic & Mfg. Co.
(e) N. P. THIELKE, Pennsylvania State College
(f) H. Z. SCHOFIELD, Battelle Memorial Institute

Panel Session on Above Subjects* (30 Minutes)

Intermetallics—New Type Refractory Alloys—By Louis Marchi or staff member, Armour Res. Foundation. (15 min.)

Molybdenum Disilicide, Properties at Elevated Temperatures—By W. Maxwell, NACA. (10 min.)

Titanium Disilicide, Properties at Elevated Temperatures—By R. Long, NACA. (10 min.)

Combinations of Carbides and Borides—Powder Ceramics—By Dr. Gordon Findley, Norton Co. (10 min.)

Related Discussion (5 min. each)

(a) R. SEELIG, American Electro Metals
(b) F. V. LENEL, R.P.I., Application of the Electrical Sintering Method to the Preparation of Ceramics and Intermetallics

Panel Session on Above Subjects* (30 Minutes)

EVENING SESSION - NOVEMBER 24
(8:00 to 10:00 P.M.)

Main Subject: *Uses and Application of Refractory Type Materials*

Problems Relating to the Usage of Refractory Materials in High Temperature Applications—By J. B. Johnson and/or R. Paris. WADC. (15 min.)

Turbine Operation with Refractory Type Materials—By G. C. Duetsch, NACA. (15 min.)

Related Discussion (5 min. each)

(a) W. R. SHERIDAN, Bell Aircraft (Rocket Nozzles)
(b) R. THIELEMANN, Pratt & Whitney Aircraft
(c) E. PEKAREK, Thompson Products
(d) S. MANSON, NACA, Thermal Shock

Panel Session on Above Subjects* (60 Minutes)

MORNING SESSION - NOVEMBER 25
(9:00 A.M. - 12:00 Noon)

Main Subject: *Ceramics and Intermetallics with Metal Additions*

Chairman: Dr. J. T. Norton, Massachusetts Institute of Technology

Theoretical Structure of Refractory Materials for Elevated Temperature Applications—By John T. Norton. (15 min.)

Additions of Metals or Alloys to Base Ceramic Type Materials—By Tom Shevlin, Ohio State University. (10 min.)

Infiltration of Intermetallic Type Bodies—By Claus G. Goetzel, Sintercast Corp. (10 min.)

Related Discussion (5 min. each)

(a) R. GURNICK, NACA
(b) J. R. TINKELPAUGH, N. Y. State College of Ceramics
(c) H. R. SPENDELOW, JR., Union Carbide and Carbon
(d) D. BENNETT, University of Illinois

Panel Session on Above Subjects* (30 Minutes)

New Developments on Titanium Carbide Compositions and Properties—By J. C. Redmond, Kennametal, Inc. (15 min.)

Elevated Temperature Properties of Zirconium Boride Alloys—By Frank W. Glaser, American Electro Metals (10 min.)

Alloys of Molybdenum Disilicide—By H. A. DeVincentis, NACA. (10 min.)

Related Discussion (5 min. each)

(a) R. WEHRMANN, Fansteel Metallurgical Corp.
(b) R. B. FISCHER, Battelle Memorial Institute
(c) W. L. HAVEKOTTE, Firth-Sterling Steel Co.
(d) J. J. HARWOOD, Office of Naval Research

Panel Session on Above Subjects* (25 Minutes)

Session Closes at 12:00 Noon

Lunch to 1:30

Tour and Inspection of NACA, Lewis Flight Propulsion Laboratory at 2:15 - 4:30 P.M.

****Panel sessions will be made up of chairman as moderator and all speakers.***

ATTEND TO THIS TODAY →

IMPORTANT: TO BE RETURNED TO ASM VIA MILITARY SECURITY OFFICER ONLY

Request for Clearance to Attend the

CONFIDENTIAL SESSION ON "REFRACTORY-TYPE MATERIALS FOR HIGH-TEMPERATURE APPLICATIONS"

Sponsored by the American Society for Metals

MONDAY AND TUESDAY, NOVEMBER 24 and 25, 1952

HOTEL CARTER—RAINBOW ROOM

CLEVELAND, OHIO

American Society for Metals
7301 Euclid Avenue
Cleveland 3, Ohio

ATTENTION: Refractory Materials Committee

Gentlemen:

TO BE FILLED OUT BY APPLICANT

Clearance is requested to attend the above confidential session.

Applicant's Name (print)_____

Birthplace_____ Citizenship_____

If birthplace not U. S., give details_____

_____

Company Affiliation and Address_____

_____

Applicant's Title or Position_____

Applicant's Home Address_____

If you have already been cleared for access to CONFIDENTIAL or higher classification of information please specify

_____
(Air Force, Navy, Research and Development Board, Atomic Energy, etc.)

on_____ in connection with_____
(date) (project or contract number, etc.)

_____

This request is based upon my need to know the information and material to be discussed at this meeting as necessary in the performance of my work and in the best interest of the military or other government services.

DATE_____ APPLICANT'S SIGNATURE_____

TO BE FILLED OUT BY MILITARY SECURITY OFFICER

I hereby confirm clearance of this applicant as indicated above.

DATE_____ (SIGNED)_____
(Military Security Officer having cognizance over applicant's plant or activity and contract)

THIS FORM MUST BE RETURNED **ON OR BEFORE NOVEMBER 15, 1952, VIA MILITARY SECURITY OFFICER** (Navy, Air Force, Research and Development, Atomic Energy, etc.) HAVING COGNIZANCE OVER THE APPLICANT'S PLANT OR ACTIVITY AND CONTRACT.

Security Officer:—When request for clearance has been approved please mail direct to
American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio

Experiments With Alpha, Beta and Gamma Rays

The following is an abstract of Kibbee Streetman's entry in the NSTA-ASM Science Achievement Awards program, divison of grades 7-10. The entry won a first-place award. Kibbee received a $100 Defense Bond and his school a check for $100 to be used in purchasing additional equipment for its science department. Kibbee, who is 14, finds science his most interesting school subject. These experiments represent his interest in atomic energy.

I did many experiments with alpha, beta, and gamma rays with several instruments I purchased in a Gilbert atomic energy set, and various things I constructed. Here are some of the many experiments I performed:

Measured the range of alpha, beta, and gamma rays; detected radioactivity in certain ores with an electroscope; detected alpha, beta, and gamma rays with a cloud chamber; produced positrons by bombarding metal foil with alpha particles; determined the radiation background count from cosmic rays; made 36 radiographs with alpha, beta, and gamma rays; determined what materials absorb the rays, and determined the effect of radiations on certain chemicals.

I designed and constructed a model breeder reactor (shown in diagram). It was constructed of concrete, lead, steel, and wood. It has a movable isotope tray that can be taken out, removable fuel rods, and other moving parts. The fuel capsule in the center contains a source that emits alpha, beta, and gamma rays. The model has the front shield of concrete omitted so that the inside can be seen. The model is scaled one inch to the foot and measures 11 in. high, 10 in. wide, and 5 in. thick.

To study the effects of radiations on photographic film, I used X-ray film. In one experiment I placed a lead design next to a film and then a beta source over the design and exposed the film for 24 hr. When I developed the film the outline of the design could be seen on the film. In another similar experiment I used a brass key and a gamma ray source. The result was similar.

Background Count of Radioactivity

In order to take a radiation count of a sample of ore or a radioactive source standard it is first necessary to determine the background radiation count. The background radiation count is due to cosmic rays. This count is subtracted from the count of the radioactive source to get the actual count from the source. In my experiment I removed all radioactive materials far enough away so they would not affect the count. With a Geiger counter I took the count for a period of 5 min. Each minute I divided into 15-sec. intervals. I recorded my data on the table below.

Minutes	0-15 sec.	15-30 sec.	30-45 sec.	45-60 sec.	Total
1st	4 counts	4 counts	3 counts	2 counts	13
2nd	3 counts	3 counts	4 counts	2 counts	12
3rd	5 counts	3 counts	5 counts	5 counts	18
4th	4 counts	4 counts	4 counts	3 counts	15
5th	3 counts	3 counts	2 counts	4 counts	12

Total for 5 min.—70 counts Average per min.—14 counts

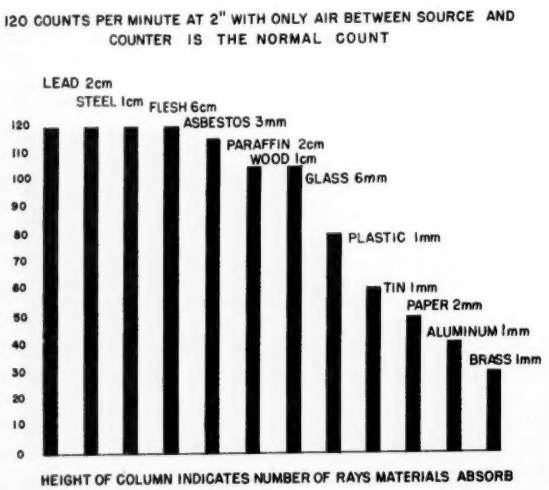
Ray Penetration

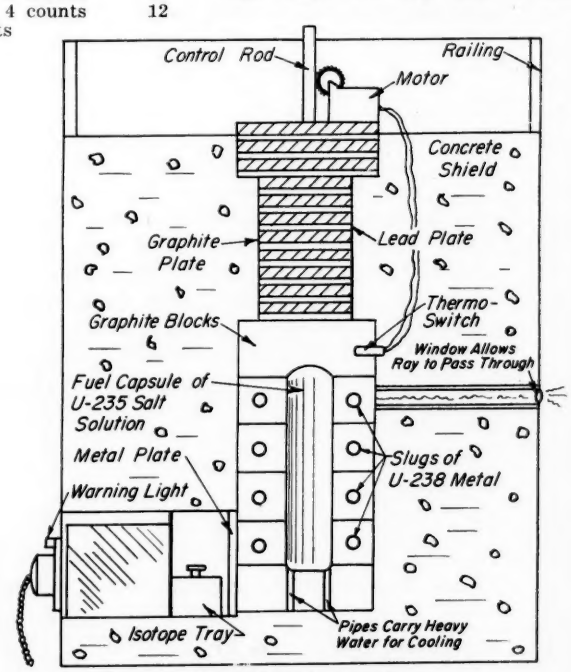
I studied penetration of alpha, beta, and gamma rays and the absorption of these rays by various materials. When I placed a beta ray source 3 in. from the Geiger counter it gave 120 clicks or counts per min. When I placed an absorbing material, such as plastic, between the source and the counter, it gave 40 counts per min. This means that the plastic absorbed 80 rays per min. I did this using other materials. From what I obtained I made a graph to represent how many rays each material absorbed per minute.

Cloud Chamber Studies

The cloud chamber I used consisted of a large round-bottom glass flask with holes in each end. Through the hole in the top a mixture of alcohol, water, and ink is poured. By means of a rubber bulb connected to the bottom the level of the liquid can be raised and lowered, thereby compressing and decompressing the air above the liquid. When this happens the vapor trails are formed. I used sources of alpha rays, beta rays, and gamma rays. Alpha trails are easiest to see. Stronger lights had to be used with beta trails and also with gamma trails which are very hard to see.

Left is Shown Kibbee's Model Breeder Reactor Made of Concrete, Lead, Steel and Wood. Below is the graph Kibbee drew to show background count of radioactivity





A Model Breeder Reactor

Worcester 1952-53 Executive Committee

Members of the 1952-53 Executive Committee of the Worcester Chapter Who Completed Program Plans for the Coming Season at a Recent Meeting Are, Front, From Left: J. Walter Gulliksen, Worcester Pressed Steel Co., Past Chairman; Harold J. Elmendorf, American Steel & Wire Co., Vice-Chairman; Wendell J. Johnson, Massachusetts Steel Treating Corp., Chairman; and Lincoln G. Shaw, Pratt & Inman, Secretary-Treasurer. Rear, from left, are: Ernest G. Nordwell, Worcester Stamped Metal Co.; Walter J. Nartowt, Greenman Steel Treating Co.; Lester M. Stern, North American Manufacturing Co.; Leonard L. Krasnow, Lodding Engineering Corp.; Harold L. Jones, Worcester Gear Works; Chester M. Inman, Consulting Metallurgical Engineer, chairman emeritus; Joseph C. Danec, Norton Co.; Stephen M. Jablonski, Wyman-Gordon Co.; Herbert D. Berry, Thomas Smith Co.; and J. F. Dempsey, Bay State Abrasive Products Co. (Reported by C. W. Russell)

Canton-Massillon Sees Film Showing Corrosion in Action

Reported by Wells E. Ellis

Metallurgist, Timken Roller Bearing Co.

The first meeting of the Canton-Massillon Chapter A.S.M. for the 1952-53 season was held on Oct. 7. E. A. Tice, of International Nickel Co.'s corrosion engineering section, introduced INCO's sound and color film entitled "Corrosion in Action".

The film was outstanding in regard to both its color photography and its technical content. The film explains such factors as the electrochemical theory, galvanic action, and passivity with amazing clarity, using animation and stop motion photography.

A short history of the development of the electrochemical theory of corrosion and the contributions made to it by certain investigators during the past 125 years was presented. The basic reactivity of metals was explained with reference to the standard electromotive series in relation to the importance of potentials, polarization, current density, and area effects. The film was concluded with a discussion of passivity and protective films. The passivation of iron by exposure to concentrated nitric acid was demonstrated by bench experiments. These also show the frailty of this kind of passivity in comparison to the more stable passivity shown by stainless alloys containing chromium and nickel.

Twenty Years Ago

Quotes From *Metals Review*
November 1932

Unusual tribute was paid recently to *Metal Progress* by William A. Kittredge, an executive of the Lakeside Press of the R. R. Donnelly Sons Co., nationally famous printers in Chicago. Said Mr. Kittredge: *"Metal Progress* . . . has set a new typographic standard for business papers. . . . Getting off to a fresh start, without the inhibitions and hampering limitations of a magazine with a long tradition, it is one of the best designed business magazines today."

Alloy Steels: Past, Present & Future

Reported by R. C. Pocock

Chief Engineer, Eng. Research Lab. Bendix Products Div.

At the October meeting of the Notre Dame Chapter A.S.M., John Mitchell, assistant to manager, alloy sales, United States Steel Co., gave a talk on "Alloy Steels: Past, Present and Future".

Mr. Mitchell's talk was primarily concerned with the alloying elements used in constructional alloy steel, and their conservation if it became necessary to suddenly expand alloy steel production. In this case, he pointed out, steel compositions would have to change to still leaner grades in which little or no critical elements would be used, citing the case of the present nickel situation.

He pointed out the problems confronting the steel industry in the event of increased alloy steel production. A portion of his talk was devoted to a misconception of the scrap situation as related to residual elements and their influence upon grades that could be made by the steel industry.

Mr. Mitchell's parting advice was that consumers should look over their own situation, and eliminate from specifications any critical element that does not serve a definite functional purpose, and put their "house of preparedness in order" as far as usage of valuable elements is concerned.

Opens Canadian Branch

The Electric Furnace Co., Salem, Ohio, has announced the incorporation of a subsidiary company in Toronto, Canefco Ltd. K. U. Wirtz, president of the Electric Furnace Co., is vice-president of the new branch, which will design industrial heat treating furnaces and other equipment in collaboration with the parent company.

At Annual Golf Meeting Dinner

Pictured at the Head Table at the Dinner Held Following the Annual Golf Outing of the Montreal Chapter in September Are, From Left: G. E. Anderson, Vice-Chairman, Entertainment Committee; W. B. Billingsley, Chapter Chairman; J. S. Johnson, Chairman, Entertainment Committee; E. M. Seale, Past Chairman; G. M. Young, Past Chairman; A. H. Lewis, Vice Chairman; and R. Thompson. (Reported by K. W. Shaw, Publicity Committee)

Nondestructive Testing Talk at York Meeting

Reported by Leon A. Hurwitz
Chief Metallurgist
Hamilton Watch Co.

Robert C. McMaster, supervisor of the electrical engineering division and the nondestructive test development laboratory at Battelle Memorial Institute, Columbus, and vice-president of the Society for Non-Destructive Testing, spoke on "Nondestructive Testing" before the September meeting of the York Chapter A.S.M.

Nondestructive testing has become a vital operation in modern industrial production and quality control. Proper application lowers production costs and increases the productivity of industries; misuse or omission on critical structures or equipment is sometimes disastrous. Averting of costly failures of oil-well drain pipe was cited by the speaker as an outstanding example whereby large capital expenditures can be protected by the extensive use of nondestructive tests.

Dr. McMaster pointed out that any valid law of nature may serve as a basis for a useful nondestructive test if it provides reliable measurements which can be correlated with material properties or discontinuities.

Present nondestructive tests are of two general types: (*a*) those involving transport of matter; (*b*) those involving transmission of energy. Transport of matter, as used in mechanical gaging, fluid-penetrant and particle-filtering tests, is generally useful only for testing of exposed surfaces, or surfaces connected to exposed areas by open channels of test objects. Transmission of energy, as used in X-ray, ultrasonic, magnetic and electric tests, may reveal material conditions and discontinuities within materials, or on surfaces of exposed cavities. Usually both types of nondestructive tests may be employed for complete industrial inspection.

The Sperry rail tester was described as an example of a magnetic flaw detector using a pick-up coil. In using this device, a heavy direct current is passed through a rail section from a testing car as the car moves. A uniform magnetic field is set up around the rail. If a transverse fissure is present in the rail, the magnetic field is disturbed. A small coil moving along just above the track surface detects this disturbance by variations in induced current which are recorded and used to indicate the location of the defect.

Dr. McMaster discussed Xeroradiography, a recent development by which X-ray images are recorded without the use of film, a process based on the change in electrical conductivity of a form of selenium when irradiated with X-rays. The process is essentially physical, and no wet processing or chemical solutions are required to develop the X-ray images. Dry pigments are used to reveal the image after exposure.

"Work-Horse" Metals of Electrical Industry Described in Dayton

Reported by D. F. Gerstle
Delco Products

Iron and copper are the "work-horse" metals in the electrical industry, according to E. A. Fox, who spoke before the September meeting of the Dayton Chapter. Mr. Fox is manager of the metallurgical development section of Westinghouse Electric Corp., East Pittsburgh.

Improvement in electrical equipment during the past 50 years is partly a result of improvement in these and other metals. In steel, for example, core loss has been markedly decreased. Core losses in electrical equipment are the no-load iron losses due to the mere magnetization of the iron core (hysteresis), and eddy current losses due to flow of currents within the laminations. The use of silicon in electrical steels was one of the first steps taken toward bringing core loss to its present low value.

Further progress is now taking place in transformer steel where oriented grain is giving added improvement in silicon steels and where high nickel and related alloys are being used.

In high-speed rotating equipment, the strength of copper assumes increased importance. Copper can be strengthened by cold working or by adding alloying elements, but both of these reduce the conductivity. However, as an exception, alloying with silver in the right amounts is found to be helpful. Fifty oz. of silver to one ton of copper improve creep strength without harming conductivity.

Aluminum is another important metal in the electrical industry. It has lower conductivity than copper, so larger cross sections must be used than would be required of copper. Aluminum requires more care in processing into electrical equipment than copper, particularly in making current conducting joints.

Improved testing techniques for soundness of metals have aided the electrical manufacturers as well as other metal users. As an example, sonic testing makes possible the detection and rejection of faulty forgings and aids in the manufacture of better products.

Gives Corrosion Course

A five-day short course in corrosion will be held Feb. 2-6, 1953, at the University of California. The course is to be given by the university's extension department and the departments of mechanical engineering, mineral technology and chemical engineering, in cooperation with the National Association of Corrosion Engineers.

Speakers from industrial and governmental laboratories and academic institutions will cover basic corrosion science theory and application of corrosion mitigation measures.

Worcester Opens Year With Smorgasbord

Worcester Chapter Opened the 1952-53 Season With a Smorgasbord. Pictured above are members of the Chapter filling their plates. The two gentlemen in the foreground are both past chairmen of the Worcester Chapter, Lloyd G. Field, general manager of Greenman Steel Treating Co. (with bow tie), and Leo P. Tarasov, Norton Co. (Photo by C. Weston Russell)

Ferrous Welding Talk at Indianapolis

Robert H. Aborn, Assistant Director of Research at United States Steel Co., Gave a Talk on the "Metallurgy of Ferrous Welding" at the September Meeting of the Indianapolis Chapter A.S.M. At the speaker's table are, from left: Edwin E. Tuttle, reception chairman; Carl O. Sundberg, chairman; Dr. Aborn; and J. D. Duncan, chapter vice-chairman

Reported by William Hensley
Allison Div., General Motors Corp.

"Metallurgy of Ferrous Welding", with emphasis on recent developments, was the subject of the talk presented by R. H. Aborn, assistant director of research, United States Steel Co., to the Indianapolis Chapter at the September meeting.

Dr. Aborn opened his address with a few brief remarks concerning the history of welding. According to Dr. Aborn, the Welding Handbook lists 32 welding processes which could be placed in two general categories—those which use mechanical pressure, and those which do not.

The principal metallurgical phenomena in welding are melting, hot cracking, distortion, transformation, aging, residual stresses, and cold cracking, some of which are not beneficial, but are nevertheless present.

The vastly improved properties obtained with shielded-arc welding as compared to nonshielded-arc welding were depicted in slides which compared tensile strength, ductility, and impact strength.

The heat-affected zone of 0.20% carbon steel was next discussed by Dr. Aborn. Slides diagramming the transformation products during the welding operations and cooling after welding were used to show the effect of cooling rates. S-curves with slow, medium, and fast cooling curves superimposed upon them were shown. Gas welding was used as an example of welding which produces a slow cooling curve. The resulting structure was soft and consisted of ferrite and pearlite. Arc welding produced a medium fast cooling curve with a resulting structure which has harder and tougher and consisted of ferrite, pearlite, bainite, and martensite. The example of a fast cooling curve obtained from spot or seam welding gave a hard structure of martensite.

The effects of welding S.A.E. 4340 steel were studied next. Preheating, concurrent heating, and post heating were presented as being very important in the welding of alloy steels. The need depends upon the mass and composition of the steel. Preheating decreases the cooling gradient and thus decreases the tendency for cracking. Dimensional changes and distortion caused by welding are best minimized, according to Dr. Aborn, by making as few passes and applying as little heat as possible. Residual stresses caused by welding should be relieved by post heating if the parts are to be machined, are subjected to stress corrosion, or are subjected to alternating stresses.

Dr. Aborn concluded his lecture by outlining the future of welding. He predicted advancements in shielded electrodes, automatic processes, and low-temperature welding processes. Following his talk, Dr. Aborn presented a motion picture of welding with various types of electrodes.

Akron Sponsors Course On Machining of Metals

The Akron Chapter has begun its annual educational program, available to all persons interested in the metal manufacturing and fabricating industry, whether members of A.S.M. or not. A large number of last year's participants indicated they would be interested in machining as this year's lecture subject, and following these suggestions, the Committee prepared a course on "Machining of Metals".

A series of six classes are being held in the Student Union Auditorium, University of Akron, from 7-9 p.m., beginning Oct. 29. Registration fee of $4.50 ($5 after Oct. 6) includes the A.S.M. textbook, "Machining—Theory and Practice."

Schedule of classes follows:

Oct. 29—"Introduction and Basic Principles of Machining", by C. R. Augden.

Nov. 5—"Materials and Machinability", by C. Floyd.

Nov. 12—"Cutting Tools", by J. Fletcher.

Nov. 26—"Metal Cutting", by H. S. Mitchell.

Dec. 3—"General Considerations of Machining and Grinding", by W. F. Clements.

Dec. 10—"Machining". Panel discussion by instructors.

Discusses Adhesion of Electrodeposits and Metal Cleaning

Reported by J. Turk
Process Control Supervisor
Emerson Electric Mfg. Co.

The St. Louis Chapter A.S.M. opened its fall program with a talk by C. C. Helmle, vice-president of Enthone, Inc. His talk, "Adhesion of Electrodeposits and New Methods of Cleaning and Oxide Removal", was supplemented by colored slides and a demonstration of rust removal on steel parts.

Mr. Helmle pointed out that maximum adhesion between the plate and base metal is essential, not only for resistance to corrosion, but also for better luster. Many factors, such as dirt, carbon, oxide, oils, greases, overpickling, and nonhomogeneous base metal, may contribute to poor bonding.

Various methods of cleaning were described, with emphasis on the emulsifiable solvent cleaners which have good wetting power. Such material is excellent for precleaning before straight alkaline cleaning operations. Where oxides are present, a combination of cleaning operations may be necessary.

Examples of cold worked steels which require exceptional techniques before the surface can be prepared for plating were presented. Various nonferrous alloys require special treatment, depending on the alloy phases which may be present. Even the slow transfer from one bath to another may cause harmful deposits on the metals.

An explanation for the failure on fabrication of some plated material was given. High temperatures, approaching the melting point, may be reached at the interface during drawing or rolling. Buffing may cause severe surface flow, depending in part on lubricants, coolants, and other factors. In general, while careful consideration should be given the chemistry of preparation, careful study and analysis of the metallurgical aspects is very important.

Mr. Helmle demonstrated the new Enthone electrolytic alkaline process for rust removal. By a variation of the process, cadmium can be simultaneously deposited while derusting is accomplished.

Twenty Years Ago

Quotes From *Metals Review*
November 1932

At the October dinner meeting of the Chicago Chapter, EDGAR C. BAIN, research laboratory, U. S. Steel Corp., discussed the hardenability of steel, giving in essence his Campbell Memorial Lecture, just presented before the National Metal Congress at Buffalo.

THIRTY YEARS AGO

An editorial in July 1922 issue of *Transactions* admonishes graduating metallurgical students not to set a monetary value on their services out of proportion to what they are able to deliver. "One university of repute," the editorial states, "graduating 23 individuals from the metallurgical department, has so far succeeded in placing but five of the number." How times have changed!

— 30 —

H. J. FRENCH of the Bureau of Standards (now vice-president of International Nickel Co. Inc., and also a past national president) was named to serve Washington Chapter as chairman in 1922-23, and JEROME STRAUSS of U. S. Navy Yard (now vice-president, Vanadium Corp. of America) was secretary-treasurer.

— 30 —

ARTHUR W. F. GREEN, John Illingworth Steel Co. (now chief metallurgist, Allison Div., General Motors Corp.) was re-elected Philadelphia chairman, and C. B. SWANDER, Wagner Electric Mfg. Co., became chairman in St. Louis.

— 30 —

An advisory committee on ferrous metals, made up of representatives of several scientific and technical societies, was appointed in 1922 to cooperate with the Bureau of Standards in directing its investigations concerned with iron and steel. The American Society for Steel Treating was represented by Prof. A. E. WHITE, director of engineering research, University of Michigan (first national president in 1920), and T. D. LYNCH† of Westinghouse Electric & Mfg. Co.

— 30 —

The American Institute of Mining and Metallurgical Engineers was represented on this committee by BRADLEY STOUGHTON, consulting engineer (now professor emeritus at Lehigh University and A.S.M. president in 1942), and JOHN A. MATHEWS†, president of Crucible Steel Co. of America.

Lindberg Goes West

The Lindberg Engineering Co., Chicago, manufacturers of industrial heat treating furnaces and supplies, has made plans to build a plant and offices in Los Angeles. The new plant will enable the company to provide better service to west-coast customers, help speed up defense orders to the aircraft industry, and give the necessary capacity for new projects and the production of high-frequency equipment, low-frequency melting and radiant-tube furnaces.

Necessity of Conserving Steel Topic of Lecture

Reported by William H. Myers
Metallurgical Department
Macwhyte Co.

The past, present and fture of constructional alloy steels were discussed by John Mitchell, assistant to manager, alloy sales, United States Steel Co., at the September meeting of the Milwaukee Chapter.

Entitled "What Steels Can We Use?", Mr. Mitchell's talk outlined the conservation steps that have been taken to circumvent critical shortages. It was a statement of cold facts and conclusions about metals production, particularly if alloy steel production were suddenly expanded.

Mr. Mitchell explained that plans should be made now as to future uses of grades containing critical elements and that conservation of alloying materials has not been sufficient, up to the present, to set our "house in order". Long-range thinking and planning should be carried out now to circumvent still further demands upon alloys as related to the supply. Consideration should be given to the fact that no element should be wasted in use if it does not serve a specific and definite function in performance of the steel.

Further emphasis was placed upon the influence of scrap containing alloying elements—how it has changed and how the approach to the future would have to change to conform to a new set of conditions.

IMPORTANT MEETINGS

for December

Dec. 3-5—Society for Experimental Stress Analysis. Fall Meeting and Exhibition. McAlpin Hotel, New York. (W. M. Murray, Secretary-Treasurer, S.E.S.A., Central Square Station, Cambridge 39, Mass.)

Dec. 4-6—American Institute of Mining & Metallurgical Engineers. Tenth Electric Furnace Steel Conference. Hotel William Penn, Pittsburgh, Pa. (Ernest Kirkendall, Secretary, Metals Branch, A.I.M.E., 29 West 39th St., New York 18, N. Y.)

Dec. 7-10—American Institute of Chemical Engineers. Annual Meeting. Hotel Cleveland, Cleveland, Ohio. (S. L. Tyler, Executive Secretary, A.I.Ch.E., 120 East 41st St., New York 17, N. Y.)

Dec. 17—Institute of the Aeronautical Sciences. Sixteenth Wright Brothers Lecture. U. S. Chamber of Commerce Bldg. Auditorium, Washington, D. C. (R. R. Dexter, Secretary, I.A.S., 2 East 64th St., New York 21, N. Y.)

At Chicago Steel Treaters' Night

"Steel Treaters' Night" at the September Meeting of the Chicago Chapter Featured R. F. Thomson, Detroit Chapter Chairman and Head of the Metallurgy Department of the Research Laboratories Division of General Motors Corp., Who Spoke on "The Selection of Steels for Engineering Applications". Shown at the speaker's table, from left, are: Otto Zmeskal, director of the department of metallurgical engineering, Illinois Institute of Technology, vice-chairman; Larry E. Simon, chief metallurgist, Electro-Motive Division, General Motors Corp., past chairman; Robert F. Thomson; Dennis J. Carney, chief development metallurgist, U. S. Steel Co., technical chairman of the meeting; and E. L. Roff, chief control metallurgist, U. S. Steel Co., chairman. Dr. Thomson presented a scientific approach to the load-carrying capacities of various lean alloy steels, and described the inter-relationship of applied and processing stresses as related to the strength of steel parts in the heat treated condition. He showed slides depicting how laboratory testing equipment and techniques simulate service conditions. (Reported by Braly S. Myers, International Harvester Co.)

Talks on Shell Steel at Birmingham

Shown at the Speaker's Table at the October Meeting of the Birmingham Chapter A.S.M. Are, From Left: S. F. Carter, Past Chairman; Percy Still, Coffee Speaker; Norman V. Mills, Who Spoke on "Shell Steel"; J. M. Edge, Vice-Chairman; R. H. Madden and Paul Kendrick, Executive Committee and Program Chairman, Respectively; and D. C. Glenn

Reported by Robert Bramlette
American Cast Iron Pipe Co.

The Birmingham Chapter held its first meeting on Oct. 1. A program on "Shell Steel" was presented by Norman V. Mills, ordnance engineer, Birmingham Ordnance District.

Mr. Mills discussed the production of 105 mm. shells by following the steel from the blast furnace to the firing line. A high stress is placed upon the quality of steel for shells and a great number of precautions are taken to insure this quality level. One of the first assurance tests is the macro-etch test of the billets before they leave the steel mill. This test is good insurance against "pipe" in the billet and inclusions. Another step which is taken to keep the quality level high is that of using only the bottom eight billets from an ingot and discarding the top billet.

Mr. Mills described the actual production of individual shells from the "slugs" which are broken from the billets. The process consists of two hot forging operations followed by rough machining, then cold "nosing", heat treatment and finished machining. The physical requirements of the steel are 65,000 yield strength, 15% elongation, and 30% reduction of area.

Mr. Mills displayed the various stages of the operations with sample pieces which started with the slug and ran to the finished shell.

Following Mr. Mills' talk the motion picture "The Making and Shaping of Steel" was shown.

A coffee talk was given by Percy Still, Tennessee Coal, Iron and Railroad Co., who described the recent ABCOR meeting of the Atlanta, Birmingham, Chattanooga and Oak Ridge chapters at Oak Ridge, Tenn.

Dayton Offers Lecture Series on Machining of Metals and Toolsteels

This year the Dayton Chapter A.S.M. is offering a series of four lectures on "Machining of Metals", and a series of three lectures on "Toolsteels".

Meetings are scheduled to be held in the auditorium of the Colonel White High School. Dates, subjects and speakers are as follows:

Machining of Metals

Oct. 15—Basic Principles of Metal Cutting, by A. B. Albrecht.

Oct. 22—Machinability of Steels, by W. McCrabb.

Oct. 29—Machinability of Cast Steel, Iron, and Malleable Iron, by O. G. Saunders.

Nov. 5—Machining of Toolsteels and Nonferrous Metals, by L. L. Jaffe.

Toolsteels

Nov. 19—Classification and Selection of Toolsteels, by S. R. Prance.

Nov. 26—Toolsteels, Heat Treatment, and effect of Alloy Elements, by R. W. Edmonson.

Dec. 3—High Speed Steels, by S. M. Depoy.

New Manufacturing Plant

The Claud S. Gordon Co., Chicago, has announced the opening of its new manufacturing plant in Richmond, Ill. Modern, new machinery has been installed for the manufacture of the company's line of thermocouples, pyrometer accessories, specialty instruments, and metallurgical testing machines.

The new facilities include a complete insulating mill for applying insulation to all types of thermocouple wire and extension lead wire to meet standard and special order requirements.

Meet Your Chapter Chairman

SYRACUSE

I. A. Psyck, chief metallurgist at Easy Washing Machine Corp., is a graduate of St. Bonaventure College, Olean, N. Y., class of 1931. After receiving his B.A. degree he did postgraduate work at the University of New York. He has been with the Easy Corp. for the past ten years.

A family man, Mr. Psyck has four children, two boys and two girls, who are a great help to him in the enjoyment of his hobbies—fishing, gardening and boating. As yet, however, the children haven't started to help their dad on the golf course.

Among the organizations he belongs to is the Syracuse Liederkrantz, and he is a director of the Syracuse Electroplaters Society.

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INDIANAPOLIS

Carl O. Sundberg was born in East Cleveland, Ohio, in 1916, and following his father's footsteps, spent one year working in the rolling mills after his graduation from high school. He received his B. S. degree from Virginia Polytechnic Institute in 1939.

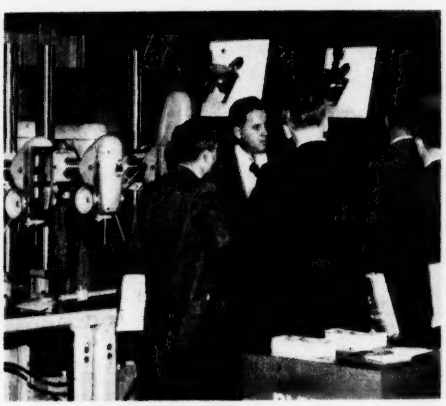
His initial experience as a metallurgical tester was in the hot strip mill at Republic Steel Corp., Cleveland, for a few months, after which he was accepted as a technical apprentice on the training program of the American Steel and Wire Co.,

Joliet, Ill., where he was exposed to the intricacies of steel rod and wire manufacture. Carl points out that "serving time in Joliet" wasn't too bad for him, for it was there that he met and married his wife, Lela.

He took a position as associate engineer with the Army in 1942 and took an active part in the cast armor program the Army was conducting in the St. Louis Ordnance district. In 1943 he was commissioned as a Naval ordnance officer and assigned duty with the Naval Inspection Service. After release from military service, Carl became associated with Diamond Chain Co., Inc., and is now research metallurgist for this company.

He pursues radio and TV construction as a hobby, is in the "duffer" class of golf, just able to break 100, and enjoys tinkering around the house.

Scenes From the



NATIONAL METAL EXPOSITION

Photographs Taken in Convention Hall and the Commercial Museum in Philadelphia During the National Metal Exposition in October, All of Which Indicate the Great Interest Taken by the Visitors to the Show, Which Was Attended by More Than 78,000 People. The center group of five pictures point up the general interest shown by all visitors in the various booths exhibiting. The photograph on the top left is of the crystalier on the stage in the Arena, a structure symbolizing atomic crystals. Center and bottom cuts are general views of exhibits and visitors in the Arena. Top right picture shows a part of the group of 1974 students who were guests of the American Society for Metals on Young Engineers' Day. Center and bottom, right, are a good indication of the number of visitors who crowded into the halls every day of the show.

Milwaukee Makes First Trophy Award

Sixteen Past Chairmen of the Milwaukee Chapter Have Contributed a Gold Golf Trophy, to be Known as the Ernie Guenther Trophy, a Traveling Award to be Made Each Year to the Outstanding Golfer of the Day at the Chapter's Annual Tournament. E. G. Guenther, vice-chairman, presents the trophy to Herb C. Ende, district sales manager, Crucible Steel Co. of America, winner of the 1952 tournament, while G. B. Kiner, past chairman, looks on. (Photograph by D. R. Matthews, Allen-Bradley Co.)

Meet Your Chapter Chairman

NEW HAVEN

Carl B. Christensen, chairman of the New Haven Chapter, A.S.M., is also past chairman of the Fairfield Chapter of the American Society of Tool Engineers, as well as a member of the American Society of Mechanical Engineers. He has been active in his field since his matriculation at Ohio State University where he received his degree.

Originally from Erie, Pa., where

his family still lives, Mr. Christensen has traveled all over the country, both on business and for pleasure. In the early 1930's Carl was an All-American Football star, playing right end. He is active in numerous social and fraternal organizations in the New Haven and New York area. Recently the American Airlines honored Mr. Christensen by conferring upon him the title "Admiral of the Flagship Fleet". He is married and has a daughter, Susan Eileen, age 7, and what spare time there is left in his day he spends sailing, flying, or with his trotting horses.

In addition to his position as president of the Ready Tool Co., he is vice-president and director of the Commercial Metal Treating Co., Bridgeport.

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CANTON-MASSILLON

Gordon Meldrum graduated from the General Motors Institute of Technology in Flint, Mich., in 1931, and worked in the G. M. plants in Syracuse, N. Y., and Anderson, Ind., until 1936. Since that time he has been in the metallurgical department of the central alloy district of Republic Steel Corp., and is presently assistant metallurgical laboratory director.

Gordon has three children, Janet, 18, Charles, 13, and Gordon, 9. He is a baseball and football fan, golfs and swims (occasionally), and likes to bowl in the winter. Mr. Meldrum is presently serving on the A.S.T.M. committee on methods of testing, and also on the S.A.E. subcommittee on steel hardenability.

Gordon is very enthusiastic about his A.S.M. Chapter activities, and hopes that his year as chairman will turn out to be the banner year for the Chapter.

Importance of Temper Brittleness In Specifying Steels

Reported by Almon E. Leach
Metallurgist, Bell Aircraft Co.

The phenomenon of temper brittleness should receive more attention in the specifications of steel for end uses. Hardenability, of course, is a primary consideration, but all too often it does not give a complete picture of the suitability of a particular low-alloy steel to a given application.

B. R. Queneau, chief metallurgist, Duquesne Works, United States Steel Co., reviewed the subject of "Temper Brittleness" at the September meeting of the Buffalo Chapter.

An interesting comparison was made between two steels of different chemical compositions but having equivalent hardenabilities. When one steel was substituted for the other, it proved totally unsatisfactory because of the low impact resistance which developed during tempering.

Emphasis was placed on the fact that temper embrittlement is disclosed by transition from a ductile impact fracture to a brittle impact fracture at a higher temperature, and not necessarily by lower impact energy absorption at a constant temperature.

It is not often realized that time, as well as temperature, is an important factor in embrittlement during tempering. The temperature range for temper embrittlement is determined as being that range in which embrittlement will develop during tempering for *normal* lengths of time. This does not necessarily mean that embrittlement will not develop at temperatures outside this range when excessive holding times are employed. Further, concerning rate of embrittlement, it is usually true that steels having poor hardenability will embrittle at a lower rate than steels having good hardenability. Also, the latter steels usually embrittle at higher temperatures. The rate of embrittlement reaches a maximum at a temperature intermediate between the maximum and minimum temperatures of the embrittling range.

The cause of temper brittleness is not known but appears to be connected with a carbide precipitation because it only occurs below the eutectoid temperature. Manganese and phosphorus have an especially bad influence on susceptibility to embrittlement and should be kept low.

Dr. Queneau gave the following rules which should be observed in order to control temper brittleness:

Temper at as high a temperature as possible; cool rapidly through the embrittling range; use short tempering times; and maintain total alloy content at a minimum to produce the desired hardenability.

Compliments

To H. A. DEANE on his election to vice-president of Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich. Mr. Deane was previously operating vice-president of the brake shoe and castings division of American Brake Shoe Co., a position he had held since 1945. He is past chairman Tri-City Chapter.

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To JOHN W. QUEEN on his appointment as manager of the Joseph T. Ryerson & Co., Inc., plant in Cleveland. Mr. Queen comes to his new job from Chicago where he was manager of the alloy steel division of Ryerson. He is a past-chairman of the New Jersey Chapter A.S.M.

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To the new officers of the Gas Appliance Manufacturers Assoc., Industral Gas Division. They are: F. C. SCHAEFER, chairman, who is sales manager of the American Gas Furnace Co.; J. H. SANDS, vice-chairman, executive vice-president of Eclipse Fuel Engineering Co.

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To LOUIS MOSES, mill engineer, Bethlehem Steel Corp., on his award of first prize in the 1951 Kelly Award competition sponsored by the Association of Iron and Steel Engineers. In his paper, "A Report of Rolling Experiences", Mr. Moses demonstrated how the roll designer applies his art on a scientific foundation to solve operating problems.

Carpenter Expands

Mill expansion expected to increase production capacity by approximately 40% is underway at the Carpenter Steel Co.'s Alloy Tube Division in Union, N. J.

A new mill addition is being built to meet the rising demand for stainless steel pipe and tubing. This expansion will be achieved without an appreciable increase in the use of nickel and other strategic alloys because of the plant's emphasis on extra light wall pipe.

New Films

. Metallizing

A new 16-mm. sound film in full color has recently been released by Metallizing Engineering Co. Inc., Long Island City, N. Y. The film describes the metallizing process and shows a wide range of practical applications as reported by many users throughout industry. Every scene in the film is taken in the plant of a metallizing user. The film also shows how thin coatings of comparatively expensive metals on ordinary base metals provide desired service characteristics at very low cost, and latest methods of surface preparation, as well as the use of metallized aluminum and zinc for the protection of iron and steel equipment.

For further information about this film contact: R. J. McWaters, Metallizing Engineering Co. Inc., 38-14 30th St., Long Island City, 1, N. Y.

New Dodge Laboratory

The Chrysler Corp. plans to establish one of the most complete product control metallurgical laboratories in the country at its Dodge plant in San Leandro, Calif., to insure and improve the quality of airplane propellers which will be manufactured there.

CALENDAR CORRECTION

G. W. Hinkle will be the technical speaker at the Nov. 19 meeting of the Akron Chapter A.S.M. at the Mayflower Hotel rather than Victor Brown, as announced in the October issue of the Review.

New Warehouse Opened

Because of increasing demands for brass and copper mill products in the middle Atlantic area, the Bridgeport Brass Co. of Pennsylvania has opened a new warehouse in Philadelphia. Sales and operations are in charge David F. Snow, district sales manager.

A. S. M. Review of Current Metal Literature

An Annotated Survey of Engineering, Scientific and Industrial Journals and Books Here and Abroad Received During the Past Month

Prepared in the Library of Battelle Memorial Institute, Columbus, Ohio

W. W. Howell, Technical Abstracter

Assisted by Joseph Enke, Claudia Belknap, Ardeth Holmes and Members of the Translation Group

A GENERAL METALLURGICAL

324-A. Salvage Control in Aircraft Production. Willis L. Nye. *Aero Digest*, v. 65, Sept. 1952, p. 106-112.
A systematic method for the retrieval of waste parts or materials coupled with an educational program for personnel to stimulate interest in waste reduction. Flow sheets. (A8)

325-A. Applications of High Power Ultrasonics. E. A. Neppiras. *Industrial Chemist and Chemical Manufacturer*, v. 28, Sept. 1952, p. 408-413.
Applications include erosion of metal, dispersion of solids, emulsification, depolymerisation, biochemical and bactericidal effects, chemical activation, and in metallurgy: emulsifying immiscible metals, prevention of supercooling, degassing, and precipitation. (A general)

326-A. The Ignition of Inflammable Gases by Sparks From Aluminium Paint and Rusty Steel. F. E. T. Kingman, E. H. Coleman, and Z. W. Rogowski. *Journal of Applied Chemistry*, v. 2, Aug. 1952, p. 449-456.
Tables and photographs. (A7, L26)

327-A. Build-Up in Steel. *Steel*, v. 131, Sept. 22, 1952, p. 146-148, 150, 152.
Capacity statistics of the nation's steel producers as of July 1, 1952 and as expected Jan. 1, 1953 for openhearth, bessemer, and electric. Capacity figures for coal chemical recovery ovens. (A4)

328-A. Summarized Proceedings of the Fourth Industrial Physics Conference—Glasgow, June 1952. *British Journal of Applied Physics*, v. 3, Sept. 1952, p. 273-277.
Topics discussed at the conference included: "Physics in the Service of Metallurgy", "Meteorology in Industry", "Physics and Sound Reproduction", and "Noise and Its Suppression". (A general)

329-A. Ion Exchangers Solve Waste Disposal Problem. A. C. Reents and D. M. Stromquist. *Chemical Engineering*, v. 59, Sept. 1952, p. 336, 338-339.
Two examples of using ion exchange resins for recovering toxic and valuable chromates from rinse waters. Diagram. (A8, Cr)

330-A. Steel Shortage Emphasizes Value of Salvage by Reconditioning Steel Drums. E. G. Silven. *Industrial Gas*, v. 31, Sept. 1952, p. 8-9.
Describes reconditioning process at Acorn Cooperage, Providence, R. I. (A8, ST)

331-A. How Weirton Steel Guards Against Fire. E. T. Davis. *Iron Age*, v. 170, Sept. 25, 1952, p. 113-116.
Extensive use of built-in fire fighting systems teamed with portable extinguishers and two fire departments. Special classes to train some 300 men a year in use of fire extinguishers. Daily inspection. Special precautions before welding. (A7)

332-A. Sale of Uranium Contaminated Steel Scrap Recommended. Hanson Blatz. *Iron Age*, v. 170, Sept. 25, 1952, p. 125-127.
Recommended by a division of Atomic Energy Commission. A study indicates use of the scrap will not affect personal health or the steel product made from the contaminated scrap. (A8, A7, ST)

333-A. Nonferrous Metals Engineer Faces Challenge After Century of Progress. R. W. Diamond and B. P. Sutherland. *Journal of Metals*, v. 4, Oct. 1952, p. 1033-1035.
Historical survey of discovery and extraction of Cu, Ni, and Al in particular. Future trends for Ti and U. (A2, Cu, Ni, Al, Ti, U)

334-A. Recovery of Nickel & Zinc From Silver Refinery Waste Liquor. Part II. Chemical Methods. R. K. Dutta and T. Banerjee. *Journal of Scientific & Industrial Research*, v. 11B, Aug. 1952, p. 342-343.
(A8, Ni, Zn, Ag)

335-A. Hindsight on the Copper Market. *Metal Age*, Sept. 1952, p. 3-4.
Includes an extensive tabular supplement on the copper market: 1949-1952. (A4, Cu)

336-A. French Aluminium Industry. Maurice Moyal. *Metal Industry*, v. 81, Sept. 5, 1952, p. 191-193.
Economic survey. Tables. (A4, Al)

337-A. 1975 New Copper Demand in Free World Outside U. S. Put at 2 Million Tons, Up 50% From 1950. Part II. *Metals*, v. 23, Sept. 1952, p. 7-9.
Excerpt from Materials Policy Commission's report "Resources for Freedom". (A4, Cu)

338-A. The Secondary Aluminum Industry in the U. S. A. *Modern Metals*, v. 8, Sept. 1952, p. 52-54, 56.
Digest of a report by a group of European technical observers based on a United States tour. General nature of secondary industry, processing of scrap into ingot, casting processes, wrought products, applications, alloys, and control of production and research. Diagrams. (To be continued.) (A8, Al)

339-A. Metal Recovery by Ion Exchange. T. J. Fadgen. *Sewage and Industrial Wastes*, v. 24, Sept. 1952, p. 1101-1107.
Laboratory study to obtain information on size of equipment, operating costs, and potential accomplishment. Examples for treating three rinse waters: chromic acid, nickel, and acid copper. Relation to stream pollution and water conservation. (A8, Cr, Ni, Cu)

The coding symbols at the end of the abstracts refer to the ASM-SLA Metallurgical Literature Classification. For details write to the American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

340-A. Waste Disposal at the Fontana Steel Plant. H. I. Riegel. *Sewage and Industrial Wastes*, v. 24, Sept. 1952, p. 1121-1129.
Water conservation and pollution control procedures at Fontana, Calif., plant of Kaiser Steel Corp. which is located in a water-scarce area. (A8, D general)

341-A. Steel: What Will the Industry's Future Be? W. V. Packard. *Iron Age*, v. 170, Oct. 9, 1952, p. 193-195.
Brief discussion. Tables. (A4, ST)

342-A. The Road Ahead. *Iron Age*, v. 170, Oct. 9, 1952, p. 292-294, 296-298, 300, 302, 304, 306, 308, 310, 312, 314, 316, 318, 320, 322, 326. (Based on "Resources for Freedom", the President's Materials Policy Commission Report, Vol. I.)
General economic survey covering our raw material resources: consumption, present and anticipated status; need for conservation; etc. (A4)

343-A. General Outlook for Metals. E. L. Shaner. *Journal of the American Zinc Institute*, v. 30, 1952, p. 21-29.
Brief economic analysis. (A4)

344-A. The Future of Zinc Ore Production in the United States—Eastern District. William Black. *Journal of the American Zinc Institute*, v. 30, 1952, p. 52-53.
(A4, B10, Zn)

345-A. A Quick Review of the Zinc Mine Production and Particular Developments in the Mid-Central States. O. W. Bilharz. *Journal of the American Zinc Institute*, v. 30, 1952, p. 54-57.
(A4, B10, Zn)

346-A. Estimated Zinc Production in Colorado, New Mexico, Arizona, and Utah—1952. W. C. Page. *Journal of the American Zinc Institute*, v. 30, 1952, p. 57-62.
(A4, B10, Zn)

347-A. The Future of Zinc Ore Production and Development in Nevada and California. S. S. Arentz. *Journal of the American Zinc Institute*, v. 30, 1952, p. 62-68.
Surveys the above. (A4, B10, Zn)

348-A. Outlook for Zinc Production in Idaho and Washington. J. E. Berg. *Journal of the American Zinc Institute*, v. 30, 1952. p. 68-73.
(A4, B10, Zn)

349-A. Zinc Resources of Butte and Montana. F. A. Linforth. *Journal of the American Zinc Institute*, v. 30, 1952, p. 73-83.
(A4, B10, Zn)

350-A. Outlook for Brass. William M. Goss. *Journal of the American Zinc Institute*, v. 30, 1952, p. 87-94.
Economic prospects with special reference to use of Zn in brass. (A4, Cu, Zn)

351-A. World Zinc Situation. S. D. Strauss. *Journal of the American Zinc*

Institute, v. 30, 1952, p. 94-105.
A survey. Graphs and table.
(A4, Zn)

352-A. Zinc Resources and Development in Canada. F. Lloyd Hallam. *Journal of the American Zinc Institute*, v. 30, 1952, p. 106-114.
(A4, B10, Zn)

353-A. Zinc Resources and Development in Africa. Francis Cameron. *Journal of the American Zinc Institute*, v. 30, 1952, p. 115-120.
(A4, B10, Zn)

354-A. Aluminium Fabrication. *Metal Industry*, v. 81, Sept. 19, 1952, p. 223-226.
Account of a visit to the Northern Aluminium Co.'s Banbury Works (England) in which the departments of remelt, sheet mill, heat treatment, extrusion, quality control, and laboratories are described. (A5, Al)

355-A. Historical Aspects of and Conservation in Constructional Alloy Steels. John Mitchell. *Metal Progress*, v. 62, Oct. 1952, p. 97-103, 144.
Past and present conservation of critical materials (Ni, Cr, Mo, Mg) in alloy steel. Future requirements. Graphical information. (A4, AY)

356-A. The Marshall Plan and French Mining. Maurice Moyal. *Mining Magazine*, v. 88, July 1952, p. 9-15; Aug. 1952, p. 86-89.
Reviews France's industrial revival, as well as the effect of ECA aid for exploration. Aug. issue deals with French overseas territories. (A6, B12)

357-A. A Dictionary of Metallurgy. A. D. Merriman and J. S. Bowden. *Metal Treatment and Drop Forging*, v. 19, July 1952, p. 319-326; Aug. 1952, p. 355-362; Sept. 1952, p. 391-398.
July issue: "Cobalt" to "corronizing." Aug. issue: "Corrosion" to "cuttlefish process." Sept. issue: "Cyanide hardening" to "Diorite." (To be continued). (A10)

358-A. Disposal of Plating Room Wastes. IV. Batch Volatilization of Hydrogen Cyanide From Aqueous Solutions of Cyanides. Barnett F. Dodge and Walter Zabban. *Plating*, v. 39, Oct. 1952, p. 1133-1139.
Some results from small-scale laboratory experiments on batch volatilization of HCN gas, dealing mainly with effect of most important rate-controlling variables. Graphs and tables. (To be continued.) (A8, L17)

359-A. The World Metal Position. A. F. Dunbar. *Plating Notes*, v. 4, June 1952, p. 68-73.
Brief economic survey with some information on ore deposits. (A4, B10)

360-A. Ion Exchange. New Hope for Waste Recovery. Allen G. Gray. *Steel*, v. 131, Oct. 20, 1952, p. 96-100.
Treatment of phosphoric acid pickling solutions, Cr plating baths, and Cu stripping baths. (A8, L12, L17, Cr, Cu)

361-A. (Book.) **Directory of Indian Mines & Metals.** P. K. Ghosh. 208 pages. Mining, Geological & Metallurgical Institute of India. Rs. 15. 27 Chowringhee Rd., Calcutta 13, India.
Includes price lists and grade analyses. Trend of mineral industry in India; all mined materials are dealt with. Future trends, working methods, surface plant installations, administration, working conditions, health and safety. (A10, B12)

362-A. (Book.) **Government-Owned Inventions for Free Use.** 104 pages. Government Patents Board, U. S. Dept. of Commerce. (Supt. of Documents, Washington). $1.00.
Lists 2339 patents available free to manufacturers, covering a broad range of fields including metallurgical. Indexed by industry group. (A10)

363-A. (Book.) **Industrial Waste Treatment.** Edmund B. Besselievre. 391 pages. 1952. McGraw-Hill Book Co., 330 W. 42nd St., New York 18, N. Y.
Factors that enter into a waste problem and general principles of treatment. Specific information for a variety of wastes including pickling liquors and plating wastes. Chapter bibliographies. (A8, L12, L17)

364-A. (Book.) **Metallurgical Engineering Principles.** Reinhardt Schuhmann, Jr. 390 pages. 1952. Addison Wesley Press, Inc., Cambridge 42, Mass. $6.50.
Engineering principles common to all unit processes in ten chapters: The unit process of chemical metallurgy; stoichiometry; the heat balance; metallurgical fuels; combustion of fuels and heat utilization; fluid flow; steady heat flow; unsteady heat flow; phases in pyrometallurgical systems; and refractory materials. Each chapter is followed by a series of problems. (A general, P general)

365-A. (Pamphlet.) **Quarterly Bulletin of Steel Statistics for Europe.** Steel Section, Economic Commission for Europe, Geneva, Switzerland.
Tabular data arranged by countries. Text is in both English and French. (A4, ST)

B

RAW MATERIALS AND ORE PREPARATION

333-B. Liquid Cyclones. S. Hesling. *Chemical & Process Engineering*, v. 33, Sept. 1952, p. 483-485.
Development, design, construction, applications, and performance of equipment now being used in fields related to coal preparation, heavy chemicals, and metals. Illustrations. 11 ref. (B14)

334-B. The Iron Ore Position. A Survey of Current Developments. *Metallurgia*, v. 46, Aug. 1952, p. 79-82.
Importance of adequate iron ore supplies to production of United Kingdom's requirements of pig iron. Immediate and future prospects in the light of criteria by which ore reserves are assessed—quality, accessibility, and quantity. (B10, Fe)

335-B. The Production and Utilisation of Metallurgical Coke. J. P. Graham. *Metallurgia*, v. 46, Aug. 1952, p. 74-78, 82.
Coking industry in relation to present metallurgical coke position; production of coke and factors of importance in blast furnace coke utilization. Trends. 10 ref. (B18, D1, Fe)

336-B. (German.) **On the "Statistical Mechanics" of Grinding Processes.** O. Theimer. *Kolloid Zeitschrift*, v. 128, Aug. 1952, p. 1-6.
Theoretical study based on the observation that crushing effects in the grinding of powders are accompanied by sintering effects. The resulting formula is similar to Rosin-Rammler's well-known empirical formula. 12 ref. (B13, H10)

337-B. Where 1972's Iron Ore Is Coming From. *Business Week*, Oct. 4, 1952, p. 70-72, 74, 76-77.
Economic survey in which open pit vs. underground mining and beneficiation are discussed. (B10, B12, Fe)

338-B. Improving the Density and Strength of Charcoal Briquets. Theodore Breitmayer and Frank B. West. *Industrial and Engineering Chemistry*, v. 44, Sept. 1952, p. 2234-2237.
Pros and cons of the use of charcoal vs. coal and a study of two methods for above purpose. (B18)

339-B. Fundamental Investigation of Steel Plant Refractories Problems: VI. Arnulf Muan and E. F. Osborn. *Industrial Heating*, v. 19, Sept. 1952, p. 1696, 1698, 1700, 1702, 1704.
X-ray data for crystalline phases studied and a summary of characteristics of the four systems. Tables and graphs. (Concluded) (B19, D general)

340-B. On the Role of Alkali Cyanides in the Depression of Pyrite. K. K. Majumdar. *Journal of Scientific & Industrial Research*, v. 11B, Aug. 1952, p. 344-346.
Mechanism and experimental results. 11 ref. (B14)

341-B. Notes on the Metallurgy & the Resources of Rare Metals in South Africa. D. D. Stitt. *South African Mining and Engineering Journal*, v. 63, Aug. 30, 1952, p. 1103, 1105, 1107.
Presidential address to the Chemical, Metallurgical, and Mining Society of South Africa. Among the metals discussed are: Be, Li, Mg, Al, Zr, Ti, Mo, and U. (B10)

342-B. Metals and World Affairs. July 1950 to 1952. E. F. Jeal. *South African Mining and Engineering Journal*, v. 63, Aug. 30, 1952, p. 1119, 1121, 1123.
A general survey of economic conditions, including references to Southern Africa and its resources. (B10, A4)

343-B. Dwindling Coking Coal Reserves. A. Wyn Williams. *Utilization*, v. 6, Sept. 1952, p. 22-26.
Especially in relation to expansion of the steel industry. (B18, D general, ST)

344-B. Radioactivity in Mineral Dressing. A. M. Gaudin. *Mining Journal*, v. 249, Sept. 26, 1952, p. 340-342. (A condensation.)
Use as a research tool; for control of nonradioactive plant processes; and as a mineral separating tool. (B general, S19)

345-B. Factors in the Economics of Heat-Treated Taconites. Will Mitchell, Jr., C. L. Sollenberger, and Ford F. Miskell. *Mining Engineering*, v. 4, Oct. 1952; *Transactions of the American Institute of Mining and Metallurgical Engineers*, v. 193, 1952, p. 962-967.
Heat treatment of ore prior to comminution reduces power requirements for grinding, reduces grinding media wear, and improves recovery of iron values from Minnesota magnetic taconite. Test data and analysis of economics of commercial application. Tables, graphs, and micrographs. (B13, Fe)

346-B. The Tromp Heavy Media Process. John Griffen. *Mining Engineering*, v. 4, Oct. 1952; *Transactions of the American Institute of Mining and Metallurgical Engineers*, v. 193, 1952, p. 967-968.
The process and its applications to separation of coal and magnetite. (B14)

347-B. Improved Sintering at Benson. *Mining World*, v. 14, Oct. 1952, p. 32-33.
Method for feeding magnetite concentrates into sintering machines which results in increased capacity and better products. (B16)

348-B. Crushing Practice and Theory. Part X. Characteristics and Performance of Hammermills. Part XI. Crusher Product Curves and Tables. Brownell McGrew. *Rock Products*, v. 55, Sept. 1952, p. 67-69; Oct. 1952, p. 107-109, 156.
(To be continued.) (B13)

349-B. Hawkins Iron Ore Beneficiation Plant of the Cleveland-Cliffs Iron Company. W. R. Van Slyke. *Skillings Mining Review*, v. 41, Oct. 18, 1952, p. 1, 4, 12-13.

Plant which has been moved to edge of pit, in line with a present trend. Diagrammatic flow sheet is included. (B13, B14, Fe)

350-B. Treatment of Titaniferous Magnetite Ore From Iron Mountain, Wyo. A. E. Back, C. J. Chindgren, and R. G. Peterson. *U. S. Bureau of Mines,* Report of Investigations 4902, Aug. 1952, 15 pages.

Laboratory development of method. The ore is roasted with 15% Na_2CO_3 to convert vanadium to a water soluble form and fix soda for subsequent electric smelting step. Approximately 90% of V is recoverable in a product assaying 80% V_2O_5. Leached calcine is briquetted and smelted in a graphite-lined electric-arc furnace. Substantially all of Ti is recovered in a soda slag, assaying 60% TiO_2 and 2% Fe, which can be upgraded to 75-80% TiO_2 by leaching with dilute H_2SO_4. About 90% of Fe is recovered as pig iron, containing only minor amounts of V, Ti, and S. 11 ref. (B14, B17, D1, Fe, Ti)

351-B. (Book.) **Fuels and Combustion.** Marion L. Smith and Karl W. Stinson. 340 pages. McGraw-Hill Book Co., 330 W. 42nd St., New York 18, N. Y. $6.50.

Fundamental and factual information concerning solid, liquid, and gaseous fuels and the problems associated with their combustion. Theories of combustion of the three major classes of fuels, and latest designs of gas and oil burners and coal burning equipment. Combustion of fuels in engines, turbines and rockets. (B18)

352-B. (Book.) **The Mineral Resources of the World.** William Van Royen, Oliver Bowles, and Elmer W. Pehrson, editors. 181 pages. 1952. Prentice-Hall, Inc., 70 Fifth Ave., New York 11, N. Y.

Minerals reviewed are coal, petroleum, water, Fe, Mn, Ni, chromite, W, Mo, V, bauxite, Cu, Pb, Zn, Sn, Hg, Au, Ag, Pt-group metals, U, Ra, Th, phosphate rock, potash, sand pyrites, NaCl, diamond, asbestos, fluorspar, graphite, and mica. Numerous maps and graphs. (B10)

C

NONFERROUS EXTRACTION AND REFINING

149-C. Chemical Refining of Metals. *Western Machinery and Steel World,* v. 43, Sept. 1952, p. 89-90.

See abstract, "Chemical Ore Reduction Process May Pay Out in Three Years." *Chemical and Engineering News,* item 78-C, 1952. (C general, B14, Ni, Co, Cu, Mn)

150-C. Acid-Leaching Oxidized Ores Offers New Source of Nickel. George W. Pawel. *Engineering and Mining Journal,* v. 153, Oct. 1952, p. 94-95.

Use of HCl on silicate ores to recover nickel. (C4, Ni)

151-C. Aspects of the Continuous Casting of Non-Ferrous Metals. Part I. Experimental Casting Unit for Small Ingots. B. H. C. Waters. *Metal Treatment and Drop Forging,* v. 19, Sept. 1952, p. 379-384.

Tables and diagrams. (To be continued.) (C5, EG-a)

D

FERROUS REDUCTION AND REFINING

366-D. Co-Operative Research in Iron Making. K. E. Jermy. *Metallurgia,* v. 46, Aug. 1952, p. 83-86.

Organization and research work of the Iron Making Division, British Iron and Steel Research Association. 16 ref. (D general, A9, Fe)

367-D. The Fairless Works. Irwin H. Such and Walter J. Campbell. *Steel,* v. 131, Sept. 22, 1952, p. 121-144.

Comprehensive illustrated description of U. S. Steel's big new plant near Morrisville, Pa. The site covers 4000 acres. Initial annual capacity: 1.8 million net tons of ingot from nine 275-ton open hearths; 1,134,000 net tons of Fe from 2 blast furnaces; 932,000 tons of coke from 174 coke ovens; 235,000 tons of hot-rolled sheet; 289,000 tons of cold-rolled sheet; 170,000 tons of tin mill product; 285,000 tons of bars; and 281,000 tons of steel pipe. Basic capacities could be at least trebled. (D general, F general, Fe, ST)

368-D. (Japanese.) **A Study of the Production of Regenerated Pig Iron. III.** Minoru Yoda. *Nippon Kinzoku Gakkai-Si* (Journal of the Japan Institute of Metals), v. 16, Jan. 1952, p. 60-63.

Influence of coke-bed height and coke-scrap ratio upon carbon content of the pig iron produced was investigated; the furnace was operated for 17 hr. continuously in each experiment. Graphs and tables. (D1, CI)

369-D. Development Possibilities in Ironmaking. Robert Durrer. *British Steelmaker,* v. 18, Sept. 1952, p. 450-455.

Suggestions for better utilization of raw material in wider use of fuels, oxygen low-shaft furnaces, and remelting scrap in converters. (D8, ST)

370-D. Flame Radiation Research. M. W. Thring. *Industrial Heating,* v. 19, Sept. 1952, p. 1602, 1604, 1606, 1610, 1612, 1724, 1726.

Includes description of international cooperative research with an experimental furnace for flame radiation studies at the Royal Netherlands steelworks. (D8)

371-D. Discussion at the Annual General Meeting, 1952: "Experimental Open-Hearth Furnaces." *Journal of the Iron and Steel Institute,* v. 172, Sept. 1952, p. 40-43.

Joint discussion on the following papers published in earlier issues of this journal: "Experiments With the Venturi Port and Modifications Thereof", J. F. Allen; and "Summary of Results and Their Application in Practice", J. R. Hall and A. H. Leckie. Diagrams. (D2, ST)

372-D. Discussion at the Annual General Meeting, 1952: "Air Filtration and Wear in Open-Hearth Furnaces". *Journal of the Iron and Steel Institute,* v. 172, Sept. 1952, p. 43-45.

Joint discussion on the following papers published in earlier issues of this journal: "Measurement of Air Infiltration in Open-Hearth Furnaces", R. Haynes; and "Dynamic Factors Associated With the Wear of Open-Hearth Furnace Roofs," J. A. Leys and E. T. Leigh. (D2, ST)

373-D. New Iron Production Techniques. *Sheet Metal Industries,* v. 29, Sept. 1952, p. 784.

Brief notes on a report by the United Nations Economic Commission for Europe, Geneva: "Recent Developments and Trends in Iron and Steel Technology". Consists of papers by experts from five European countries and Canada. (D8, Fe, ST)

374-D. Steel: Workhorse Today and Tomorrow. *Iron Age,* v. 170, Oct. 9, 1952, p. 382-390, 392-393.

A report on recent trends in steelmaking, prepared for the Economic Commission for Europe by Robert Durrer, Zurich Polytechnicum. (D general, ST)

375-D. The All-Basic Open-Hearth Furnace in the Steelmaking Industry. D. W. Duley. *Journal of the Birmingham Metalurgical Society,* v. 32, Sept. 1952, p. 90-102.

Construction and metallurgical advantages. Diagrams and graphs. (D2, ST)

376-D. Electric Furnace Department Manufactures Large Ingots for Specialized Forge Plant. Arthur H. Allen. *Metal Progress,* v. 62, Oct. 1952, p. 118-120, 196, 198.

Progress of A. Finkl & Sons Co. in Chicago since 1879. Present-day plant and operations in the electric melt shop. (D5, F22, CN)

377-D. No Drastic Change Seen in American Blast Furnace Design. Owen R. Rice. *Steel,* v. 131, Oct. 20, 1952, p. 104, 107, 110, 113, 116, 119.

Arrangement of furnace layout generally follows either echelon, straightline, or crosswise cast-house arrangements. Automatic charging control, pneumatic bell hoists, handling of coke breeze, and gas cleaning equipment assist operator. (D1, Fe)

E

FOUNDRY

604-E. Impregnation Improves Casting Quality, Service Life. J. B. Cantwell. *Iron Age,* v. 170, Sept. 18, 1952, p. 166-167.

Methods used at Sealmore Corp., Muskegon, Mich. Air in voids is evaporated under high vacuum. The sealant, a mixture of 500-mesh metallic flour in sodium silicate, is introduced until castings are covered. Then 100-psi. air pressure is applied. (E25)

605-E. Discussion on "Some Experiments With Ductile Cast Iron". G. Singh. *Metallurgia,* v. 46, Aug. 1952, p. 93.

Discussion of the paper by C. C. Hodgson and C. S. Johnson (May 1952 issue, item 401-E, 1952). Experiences on slag removal after inoculating with Mg. Photomicrographs. (E25, Q general, G17, CI)

606-E. Rotary Melting Furnaces. *Metallurgia,* v. 46, Aug. 1952, p. 99-100.

Table contains operating results for steel, high-duty iron, malleable, Cu, gunmetal, and Al. Text information on cast iron and tin foil. (E10)

607-E. Special Mixture Overcomes Feeding Problem. *Canadian Metals,* v. 15, Sept. 1952, p. 30-32.

Casting method in which Feedex (mixture which when ignited reacts chemically to produce heat) is used to improve light alloy castings. (E23, Al)

608-E. Producing Constant Tolerance Drop Hammer Dies. Gilbert C. Close. *Finish,* v. 9, Oct. 1952, p. 21-24, 76.

Concurrent and cooperative research on above problem at Armour Research Foundation and at Northrop Aircraft Co. Kirksite die metal is used. Metal cooling methods, plaster-water ratio, casting technique,

and other features of foundry practice. (E16, Zn)

609-E. Patternmaking Today. M. J. Kellner. *Foundry,* v. 80, Oct. 1952, p. 102, 203.

Patternmaking for Al, cast iron, steel, brass, Mg, and white metal. Construction and welded parts. (E17, Al, CI, ST, Cu, Mg, Sn)

610-E. What Causes Molding Green Strength? Clyde A. Sanders. *Foundry,* v. 80, Oct. 1952, p. 108-109, 283-286.

Seven theories to explain plasticity and strength of bonding sands. (E18)

611-E. Modern Facilities Incorporated in New Alabama Pipe Foundry. William G. Gude. *Foundry,* v. 80, Oct. 1952, p. 110-113, 240.

Foundry procedure for manufacturing cast iron pipe. (E11, F26, CI)

612-E. Research Contributions to the Foundry Industry. G. A. Lillieqvist. *Foundry,* v. 80, Oct. 1952, p. 114-119, 258, 260-262, 264.

See abstract of "Role of the Research Foundry Unit", *Foundry Trade Journal,* item 537-E, 1952. (E general, A9, CI)

613-E. How to Develop Cast Products. R. J. Franck. *Foundry,* v. 80, Oct. 1952, p. 120-123, 205.

A practical method of product design that may be adopted by any foundry product-development department. It can operate at minimum cost for production of best possible product in a minimum length of time. Includes description of experimental stress-analysis setup. (E general, Q25)

614-E. Chemical and Physical Changes in Magnesium-Treated Irons. Masazo Okamoto and Renpei Yoda. *Foundry,* v. 80, Oct. 1952, p. 126-127.

Study made by varying the holding time before pouring, as well as by addition of chlorides, fluorides and oxides. Micrographs and graphs. (E25, CI)

615-E. Effect of Raw Materials on Cupola Operation. Bernard P. Mulcahy. *Foundry,* v. 80, Aug. 1952, p. 146, 148, 153; Oct. 1952, p. 206, 208-209, 211.

Fifth article of a series discusses some of the coke properties which were shown to affect operations to a noticeable extent. Sixth article deals with use of beehive coke and anthracite coal. (E10, B18, CI)

616-E. How to Make A Mold for a Pulley Casting. Pat Dwyer. *Foundry,* v. 80, Sept. 1952, p. 223-224, 226, 228; Oct. 1952, p. 229-230, 232-234.

Extensive description. Diagrams. (E19, CI)

617-E. Production of Manganese-Steel Castings. F. Cousans and W. C. Meredith. *Foundry Trade Journal,* v. 93, Sept. 11, 1952, p. 287-293.

History of Mn-steel, early production methods, typical designs of castings, and present-day foundry methods. Molding materials and washes, feeding heads, pouring, knocking out, and quenching. Mold layouts of examples of important castings. Diagrams and photographs. (E11, ST, Mn)

618-E. Productivity in the Coreshop Increased by Using Coreblowers and Synthetic Resins. P. G. Pentz. *Foundry Trade Journal,* v. 93, Sept. 11, 1952, p. 295-298; disc., p. 299-300.

Bronze foundry practice, including resins available, effect of clay, stripping, potential economies, obstacles, rates of production, and advantages of core-blowing. (E21, Cu)

619-E. Ingot-Mould Production by Sandslinger. *Foundry Trade Journal,* v. 93, Sept. 11, 1952, p. 301-304.

Discussion with author participation of "Production of Ingot Moulds by Sandslinger in a Mechanized Foundry", by J. Raymond Jones, in *Foundry Trade Journal;* see item 532-E, 1952. (E11, CI)

620-E. Sand-Cast Beryllium-Bronze. L. Grand. *Foundry Trade Journal,* v. 93, Sept. 18, 1952, p. 317-324; disc., p. 324-325.

Previously abstracted from *Metal Industry;* see item 443-E, 1952. (E11, Q general, Cu, Be)

621-E. Pattern Production Methods. F. H. Wakeham. *Foundry Trade Journal,* v. 93, Sept. 18, 1952, p. 331-332.

Problems of a pump valve-box and branch pipe. Diagrams. (E17)

622-E. Gas Content Control. *Light Metals,* v. 15, Sept. 1952, p. 306-307.

Apparatus by which gas porosity of Al-base alloys in particular is lessened by degassing. Photographs and tables. (E25, Al)

623-E. Casting Developments. A. Dunlop. *Metal Industry,* v. 81, Sept. 5, 1952, p. 183-185; Sept. 12, 1952, p. 206-207.

A review of processes giving greater precision. Basically, all are investment techniques. (E15)

624-E. Shell Molding: New Machine Makes It Automatic. *Steel,* v. 131, Oct. 6, 1952, p. 83-84, 86.

Equipment developed by Powdered Metal Products which can turn out 20 complete shells from a single set of dies. Advantages and outline of the operation. (E16)

625-E. The Influence of Primary Particles on the Grain Size of Cast Magnesium-Aluminium Alloys. W. A. Baker, Myriam D. Eborall, and A. Cibula. *Journal of the Institute of Metals,* v. 81, Sept. 1952, p. 43-47.

Experimental data determining the similarity between the superheating and carbon process for grain refinement of Mg-Al alloys and whether or not a nucleating substance was responsible for both, or either, of them. Two types of primary particle were found, one in Fe-rich phase, and other of unknown identity. Photomicrographs. 14 ref. (E25, M27, Mg)

626-E. Shell Molding. *Product Engineering,* v. 23, Oct. 1952, p. 121-127.

Mechanization, controlling factors, castable metals, and pattern materials. Fundamental steps of manual and automatic shell molding. Diagram and photographs. (E16)

627-E. Creating a Thimble. *Steel,* v. 131, Oct. 20, 1952, p. 90-91.

Operations involved in making cinder pots at Midland, Pa., plant of Mackintoch-Hemphill Co. Production consists of a series of specialized foundry operations beginning with a full-size, solid, wooden pattern. (E11, CI)

628-E. (Book.) **Foundry Sand Handbook.** Ed. 6. 265 pages. 1952. American Foundrymen's Society, 616 S. Michigan Ave., Chicago 5, Ill. $5.25.

Mode of occurrence of sands and clays; methods for sampling foundry sands and clays; preparing foundry sand mixtures for testing; methods for determining fineness; determining moisture content; determination of permeability; strength of foundry sand mixtures; method for determination of green surface hardness; determining sintering point; elevated temperature tests; chemical analysis; tentative method for testing core binders; mechanical properties of core-sand mixtures; method for determining strength of core paste; nonstandard tests; interpretation of room-temperature sand tests; maintenance of testing equipment; molding-sand mixtures for ferrous and nonferrous metals. (E18)

F

PRIMARY MECHANICAL WORKING

287-F. Machines for Cold Forming Strip. Carl Hölzer. *Machinery* (London), v. 81, Sept. 4, 1952, p. 428-434. (Reprinted from *Werkstattstechnik und Maschinenbau.)*

German machines for manufacture of straight, open, and closed sections; universal section rolling machines; section draw benches; production of formed rings and segments; truing and stabilizing; and contracting and expanding. Welding is performed in some of the machines. (F23, G4, K general)

288-F. Dodge Automates Press Forging. Ruper Le Grand. *American Machinist,* v. 96, Sept. 29, 1952, p. 123-126.

See abstract for "Continuous Press Forging Applied to Crankshafts", Joseph Geschelin, *Automotive Industries,* item 289-F, below. (F22, ST)

289-F. Continuous Press Forging Applied to Crankshafts. Joseph Geschelin. *Automotive Industries,* v. 107, Oct. 1, 1952, p. 58-59.

New Dodge Forge Plant of Chrysler Corp. (F22, ST)

290-F. Titanium Forgings. *Electrical Manufacturing,* v. 50, Oct. 1952, p. 302, 304, 306.

Problems encountered in forging Ti parts. (F22, Ti)

291-F. Heating Steel Bars for Continuous Hot Heading Operations. *Industrial Heating,* v. 19, Sept. 1952, p. 1614, 1616, 1618, 1620.

A rapid-heating, continuous, conveyerized end-heating forge used at Chicago Screw Co., Ballwood, Ill. for carbon and alloy steels. It was designed by Sunbeam Corp., Chicago. (F21, CN, AY)

292-F. Automated Forging Line Boosts Output, Cuts Costs. W. G. Patton. *Iron Age,* v. 170, Oct. 2, 1952, p. 93-96.

Automated crankshaft forging line at Dodge Div., Detroit, which has virtually eliminated manual handling in production of semifinished crankshafts from SAE 1045 steel billets. Big units in this unusual line are a Hagan rotary furnace which handles 300 billets per hr. and a 6000-ton Ajax forging press said to be largest forging press automakers are using. (F22, ST)

293-F. Producing Large Diameter Pipe to Exacting Specifications. *Iron Age,* v. 170, Sept. 25, 1952, p. 118-121. (A condensation.)

Procedures at A. O. Smith Corp., Milwaukee. Steel pipe, 8⅝ to 36 in. diam., is produced in 40-ft. lengths at rate of 90-100 pieces per hour. Press capacities range to 11,000 tons. Flash resistance welding is used. Mechanical properties, inspection, and quality control. (F26, S general, ST)

294-F. Large Forgings Will Slash Fabrication Costs. *Iron Age,* v. 170, Sept. 25, 1952, p. 128-130.

Aircraft industry analyses show how much will be gained through availability of large forgings, such as the huge presses the air force is sponsoring can produce. They will permit weight reductions, reduction of assembly labor and equipment costs, reduced machining requirements, and greater structural strength. (F22)

295-F. Discussion at the Annual General Meeting, 1952: "Cold Rolling". *Journal of the Iron and Steel Institute,* v. 172, Sept. 1952, p. 28-40.

Joint discussion on the following papers: "Cold Rolling With Strip Tension. Part I. A New Approximate Method Calculation and a Comparison With Other Methods", H. Ford, F. Ellis, and D. R. Bland; "Effect of Tension on Torque and Roll Force in Cold Strip Rolling", W. C. F. Hessenberg and R. B. Sims; "Pressure Distribution Between Stock and Rolls in Hot and Cold Flat Rolling," C. L. Smith, F. H. Scott, and W. Sylwestrowicz; and "Softening of Metals During Cold Working", N. H. Polakowski. Diagram. 27 ref. (F23, CN, AY, Cu)

296-F. Bethlehem Forges Giant Rotor Disks. *Journal of Metals,* v. 4, Oct. 1952, p. 1032.

Rotor disks for compressors in supersonic wind tunnels are 18 ft. diameter, 9 in. thick, and weigh almost 50 tons. Forging operations. (F22, ST)

297-F. Babcock & Wilcox Installs Nation's Largest Press for Forming Boiler Drums. *Marine Engineering and Shipping Review,* v. 57, Oct. 1952, p. 64-66.

See abstract of "Pierce, Draw Hollow Steel Forgings to 13 Tons", *American Machinist;* item 238-F, 1952. (F22, F26, G1, ST)

298-F. Interview With an Independent Aluminum Extruder. *Modern Metals,* v. 8, Sept. 1952, p. 37-38, 40-41.

A return-visit interview to obtain information on current outlook of precision extrusions. (F24, Al)

299-F. Details of Modernization of Certain Rolling Mills in France and Belgium. *Sheet Metal Industries,* v. 29, Sept. 1952, p. 773-783.

The works reviewed are: the Forges de Leval-Aulnoye; Phenix Works, Liege; and Ferblatil (S. A. John Cockerill). Annealing and tinplate cleaning facilities are also dealt with for the last company. Flow and other diagrams, table and photographs. (F23, J23, L17, ST)

300-F. New Forging Twist Crankshaft Output Tripled. H. C. Tuttle. *Steel,* v. 131, Sept. 29, 1952, p. 78-81.

See abstract, "Continuous Press Forging Applied to Crankshafts", Joseph Geschelin, *Automotive Industries,* item 289-F, above. (F22, ST)

301-F. One Way to Handle a Big Forging Job. *Steel,* v. 131, Oct. 6, 1952, p. 76-77.

See abstract of "Bethlehem Forges Giant Rotor Disks", *Journal of Metals;* item 296-F, 1952. (F22, ST)

302-F. Tube Company Expands Facilities, Adds New Forming Equipment. *Steel Equipment & Maintenance News,* v. 5, Sept. 1952, p. 14-15.

See abstract of "Pierce, Draw Hollow Steel Forgings to 13 Tons", *American Machinist;* item 238-F, 1952. (F22, F26, G1, ST)

303-F. Big Business From Little Springs. *Western Machinery and Steel World,* v. 43, Sept. 1952, p. 83-85.

New location and plant facilities of the Connor Spring Mfg. Co., where various sized springs are made. Materials used are music wire, oil tempered MB wire; oil tempered wire, valve spring quality; hard-drawn MB wire; Cr-V wire; stainless steel wire; phosphor bronze wire; beryllium copper; spring brass; and Inconel. Includes drawing, heat treatment, and coating of springs. (F28, T7, SG-b)

304-F. Swage It And Cut Costs. Andrew E. Rylander. *Western Machinery and Steel World,* v. 43, Sept. 1952, p. 96-99.

Machinery for swaging applicable to phosphor bronze bushings, cast iron, soft steel, and most nonferrous metals. (F22)

305-F. Changes in the Processes and Products of the Tin Plate Industry: I. Charles A. Ferguson. *Industrial Heating,* v. 19, Aug. 1952, p. 1437-1438, 1440, 1442, 1444, 1446, 1448, 1450, 1452.

Evolution of the process of producing tinplate from its beginning in England through its development in this country. Conversion from hand rolling and hand pickling to the present continuous rolling and pickling operation. Future possibility of using direct-cast wide flats. (To be continued.) (F23, L12, CN, Sn)

306-F. Some Friction Effects in Wire Drawing. G. D. S. MacLellan. *Journal of the Institute of Metals,* v. 81, Sept. 1952, p. 1-13.

Theoretical discussion which formulates a generalized version of Sach's theory, to allow for effect of a cylindrical extension to a conical die channel, commonly called a "parallel". Some previously published results are correlated to this analysis. Concludes that "parallels" have an appreciable effect on drawing force, and that allowance must be made for their effect in derivation of friction from back-pull experiments. Diagrams and photographs. 21 ref. (F28)

307-F. High-Speed End Heating of Sucker Rods for Upsetting. D. R. Dale. *Metal Progress,* v. 62, Oct. 1952, p. 115-117, 194.

Specially designed slot furnace using high-speed gas heating for forging of oil well sucker rods. Diagram and photograph. (F1, ST)

308-F. Drop-Forging Practice in Australia. (Concluded.) H. J. Merchant! *Metal Treatment and Drop Forging,* v. 19, Sept. 1952, p. 405-411, 417.

Production organization, inspection control and maintenance of machines at Australian Forge and Engr. Pty., Ltd., Sydney, N. S. W. works. Some of the methods of production, together with production rates. Future expansion of drop forging industry "Down-Under". Diagrams and photographs. (F22)

309-F. The Forward Slip in Cold Strip Rolling. R. B. Sims. *Sheet Metal Industries,* v. 29, Oct. 1952, p. 869-877.

Measurements obtained during experimental research to determine effect of combined strip tensions on roll force and torque. Experimental results for carbon steel and copper are compared with two theoretically derived equations for forward slip with and without applied tensions. An alternative and simpler method of computation is also proposed for case of rolling with tensions, based on a semi-empirical relationship. Table and graphs. (F23, CN, Cu)

G SECONDARY MECHANICAL WORKING

471-G. Definitions, Functions, Types, and Designations of Cutting Fluids. O. W. Boston. *American Society of Mechanical Engineers,* Paper 52-SA-13, 1951, 3 pages.

ASTM and ASME Committee approved standard of cutting fluid terminology developed in hope of being acceptable to both oil chemists and production men. (G21)

472-G. Time Saving Method for Tapering Aircraft Skins. *Automotive Industries,* v. 107, Sept. 15, 1952, p. 74.

Method developed by the Carborundum Co., Niagara Falls, N. Y., and the Bell Aircraft Corp., Buffalo, N. Y. A wide-belt machine is used on which cuts up to 0.1 in. deep can be taken over the entire width of Al sheets up to 72 in. Machine can also be used in polishing. (G18, L10, Al)

473-G. Flexible Cutting-Off Wheels. C. A. J. Timms. *Foundry Trade Journal,* v. 93, Sept. 4, 1952, p. 265-266; disc., p. 266-268.

Removal of runners, gates, and risers in the nonferrous dressing shop. Available methods and particularly the newly developed flexible cutting-off wheels. (G18, E24, EG-a)

474-G. Plastic Prototypes, Perspective Drawings Speed New Product Production. W. G. Patton. *Iron Age,* v. 170, Sept. 18, 1952, p. 155-158.

How Creative Industries, Detroit, uses above two methods to help production executives and shopmen more readily visualize new part production problems. Plastic prototypes are rapidly made from inexpensive wooden models. This cuts costs by minimizing later design and tooling changes. Photographs and drawings. (G general)

475-G. Wide Face Grinding Wheels Boost Cylinder Sleeve Output. J. C. O'Rourke. *Iron Age,* v. 170, Sept. 18, 1952, p. 159.

A Cincinnati Milling Machine No. 3 centerless grinder was modified to use a wheel of 15-in. face. Sleeves are made of alloy cast iron at International Harvester Co., Melrose Park, Ill. (G18, CI)

476-G. Carbide Tool Cuts Cost for Threading Hardened Studs. *Iron Age,* v. 170, Sept. 18, 1952, p. 163.

Single-point carbide tools are used in an English Cri-Dan lathe on steel heat treated to Rockwell C-28-34. (G17, C-n, ST)

477-G. Mammoth Hydraulic Press and Draw-Bench Simplify Steam Boiler Production. *Machinery* (American), v. 59, Sept. 1952, p. 192-195.

See abstract of "Babcock & Wilcox Installs New Forming Equipment"; *Steel;* item 435-G, 1952. (G1, F22, ST)

478-G. Low Cost Blanking Dies for Light Gage Aircraft Parts. G. V. Rutkoskie. *Automotive Industries,* v. 107, Oct. 1, 1952, p. 66-68.

Technique by which rubber or cork strippers are employed for expelling blanked part; Kirksite is used in place of steel for die material. (G2)

479-G. Forming and Drawing Heavy Stampings for IHC Crawler Tractor. James C. O'Rourke. *Automotive Industries,* v. 107, Oct. 1, 1952, p. 70-71.

Equipment and procedures. (G4, ST)

480-G. Cup-Drawing From a Flat Blank: Part I. Experimental Investigation. Part II. Analytical Investigation. S. Y. Chung and H. W. Swift. *Institution of Mechanical Engineers, Proceedings,* (Applied Mechanics Div.), v. 165, W.E.P. 68, 1951, p. 199-223; disc., p. 224-228.

Part I: An experimental investigation of forces, work and strains involved, and conditions for successful drawing of a cylindrical shell from a flat circular blank. Most of work was carried out on a low-carbon rimming steel, but comparative tests were made with Al, brass, and Cu of different tempers. Part II: An analysis of stresses and strains in the region of true drawing, taking into consideration effects of bending, thickness changes, strain hardening, blank-holding force, die-profile friction, and tool geometry, but not of anisotropy in material. Theoretical punch load-travel diagrams, process work, maximum punch loads and strains are compared with recorded experimental results over a wide range of tool

design, operating conditions, and materials. Diagrams and graphs. 26 ref. (G4, Q24, ST, Al, Cu)

481-G. Friction Sawing. *Iron Age*, v. 170, Sept. 25, 1952, p. 148-149.

High-speed cutting method which softens metals first, then cuts. (G17)

482-G. Reliance, Manufacturer of V-S Drives, Points to Own Press Installation. Walter Rudolph. *Modern Industrial Press*, v. 14, Sept. 1952, p. 13-14, 16, 18, 22.

Description and numerous photographs of presses and press-related equipment of Reliance Electric & Engineering Co. (G1)

483-G. Press Tools for the Tin-Box Industry. (Concluded.) G. Taylor. *Sheet Metal Industries*, v. 29, Sept. 1952, p. 822-824.

Irregular dies and their construction. Diagrams. (G1)

484-G. Centrifugally Cast Jet Engine Rings: How to Rough Machine Them. Frank Meninger. *Steel*, v. 131, Oct. 6, 1952, p. 78-79.

Tools to remove crust on castings made of Cr, Cr-Ni-Mo, and Cr-Ni-Mo-W alloy. Tabulated information on cast alloys, tool-grind data, and operating data. (G17, Cr, Ni, Mo, W)

485-G. Forming Copper Prior to Assembly. Parts I. and II. L. Bernhardt. *Welding and Metal Fabrication*, v. 20, Aug. 1952, p. 281-285; 1952, p. 316-320.

Some mechanical and physical properties of Cu and its alloys, particularly in sheet, strip, and plate forms. Suitability and choice of various forming and joining processes, including examples from various industries. Heat treatment is described. Part II: Bending, folding, and seaming. Types of welding were gas, arc, resistance, and pressure. Diagrams and photographs. (G general, K general, Cu)

486-G. Report of an Investigation of the Strain Hardening Effect Upon Subsequent Levels Due to Metal Cutting. C. L. Sonnenschein and W. P. Wallace. *American Society of Mechanical Engineers*, Paper 52-SA-25, 1952, 5 pages.

Experimental results of increase of hardness of SAE 1020 steel as a function of depth of cut for a given cutting speed, from which an analytical expression of form $H = CD^{II}$ may be written. Attempts were made to correlate resulting hardness with finish and chip type produced. Hardness measurements were made with 15-N Rockwell tester and verified by use of X-ray diffraction techniques. (G17, Q29, CN)

487-G. The Significance of the Thermal Number in Metal Machining. B. T. Chao and K. J. Trigger. *Engineer's Digest*, v. 13, Sept. 1952, p. 311-313. (Condensed from Paper 52-SA-58, *American Society of Mechanical Engineers*, June 15-19, 1952).

Theoretical analysis of heat flow in conjunction with cutting data in high-speed orthogonal metal machining operations. An explanation is offered for difference in chip curvature as cutting conditions are changed. Further significance of thermal number in metal machining. Diagrams and graphs. (G17)

488-G. Hydroforming Facilitates Drawing of an Intricate Jet-Engine Part. Joseph H. Lareau. *Machinery* (American), v. 59, Oct. 1952, p. 206-209.

New method of manufacturing a fuel nozzle swirl-cup which makes use of hydroforming process. Advantages of this method are better quality, fewer operations, and lower-cost tooling. (G8)

489-G. Recommended Procedures for Fabricating Aluminum Parts. Joseph de Feher. *Refrigerating Engineering*, v. 60, Oct. 1952, p. 1078-1080, 1118-1120.

Drilling and boring, tapping and threading, reaming, spinning, sawing, blanking, punching, and other sheet metal operations; riveting, forging, upsetting, and embossing, bending aluminum pipes, soldering, brazing, welding, and causes of welding rejects. (G general, F22, K general, Al)

490-G. Engineering on Call. Gilbert P. Muir. *Tool Engineer*, v. 29, Oct. 1952, p. 65-70.

How Westinghouse offers centralized manufacturing engineering assistance to its manufacturing divisions; in particular, metals forming and joining departments. (G general, K general)

491-G. Better Cutting on Stainless Steels. *Welding Engineer*, v. 37, Oct. 1952, p. 64-66.

Includes iron-rich powder cutting, chemical flux cutting, and arc-oxygen cutting. (G22, SS)

492-G. (Book.) Drills and Drilling Practice. Ed. 2. R. A. Schater. 62 pages. National Automatic Tool Co., Richmond, Ind. $1.00.

Drills and drilling all kinds of material. Engineering data and tables for reference purposes. (G17)

493-G. (Book.) Machining Alcoa Aluminum. 72 pages. 1952. Aluminum Co. of America, Pittsburgh, Pa.

Tool characteristics for machining Al and its alloys; speeds, feeds and depths of cuts; where common practice as well as tools of standard design may be used; and use of special practices or tools for better results. (G17, Al)

H

POWDER METALLURGY

118-H. For Hot Jets: A Man and a Gun. *Business Week*, Sept. 20, 1952, p. 66-68, 71-72, 74, 76.

Production and shaping of Kentanium, a new alloy for jet engine parts. It is made of Ti, Ta, and Cb carbides plus Ni as a binder and is fired in a cannon. (H general, T25, Ti, Ta, Cb, Ni, C-n, SG-h)

119-H. The Plansee Seminar. A Brief Account of the Conference Proceedings. *Metallurgia*, v. 46, Aug. 1952, p. 94-98.

Conference, sponsored by the Metalwork Plansee, held at Reutte, Austria, June 1952. Main themes were: physical metallurgy; hard metals; and general powder metallurgy. 11 ref. (H general)

120-H. (Japanese.) **Research on the Sintering of Doped Tungsten Powder.** Chikao Ushioda, Gen-ichi Nakazawa, and Makoto Terui. *Nippon Kinzoku Gakkai-Si* (Journal of the Japan Institute of Metals), v. 16, Jan. 1952, p. 63-66.

Although no satisfactory explanation of the action of doping can be given, its effect on sintering seems to be that when doping reagents volatilize, a finer grain size is produced than in pure tungsten. FeO impurities are appreciably reduced by action of these agents. Relationships of sintering current to shrinkage, hardness, resistivity, and apparent specific gravity are charted. (H15, H11, W)

121-H. Trapping of Gases in Cold-Compacted Powders. J. Williams. *Journal of the Iron and Steel Institute*, v. 172, Sept. 1952, p. 19-24.

A study to determine extent to which gas could be entrapped under varying compacting conditions for such dissimilar materials as iron and thoria powders. State of the trapped gases and theory. Tables and apparatus diagram. (H14, Fe)

122-H. Explosive Pressing Forms New Material. Ed. Karpick. *Steel*, v. 131, Sept. 29, 1952, p. 76-77.

Cemented titanium carbide shapes for a variety of high-temperature and wear resistant applications show promise as engineering materials. Uniform density achieved by an explosion under liquid in an old Army 14-in. gun. Called Kentanium, the new carbide uses 30% Ni as a binder and a small addition of Cb-Ta carbide to aid oxidation resistance. Machining problems. (H14, G17, Ti, C-n, SG-h, m)

123-H. Zirconium Carbide Powder; Experiments in Hot Pressing. *Chemical Age*, v. 67, Oct. 4, 1952, p. 469-474. (Based on paper by A. R. Hall and W. Watt)

Experiments on preparation and properties of sintered Zr carbides produced without use of a bonding material. Two types of powder prepared from a commercial material of specified analysis were used. (H14, Zr, C-n)

124-H. Tungsten Carbide by Pyrolysis of Tungsten Hexacarbonyl. Dallas T. Hurd, H. R. McEntee, and P. H. Brisbin. *Industrial and Engineering Chemistry*, v. 44, Oct. 1952, p. 2432-2435.

Experimental methods. Diagrams and tables. (H10, W, C-n)

125-H. Sintered Aluminium With High Strength at Elevated Temperatures. R. Irmann. *Metallurgia*, v. 46, Sept. 1952, p. 125-133.

Factors involved in the production of sintered compacts prepared from pure Al powder which are stronger and superior to pure Al and its usual alloys. Compares mechanical, physical, and corrosion properties with those of pure Al and a number of its alloys. Applications. Diagrams, graphs, and micrographs. (H15, Q general, Al)

126-H. (Book.) **La Metallurgia des Poudres.** (Powder Metallurgy.) Robert Girschig. 100 pages. 1952. Éditions de la *Revue d'Optique*, 165 rue de Sevres, Paris. (15e) France.

Practical aspects of powder metallurgy. Includes survey of applications (H general)

J

HEAT TREATMENT

251-J. Efficient Heat Treating of Large Transmission Parts. E. R. Peterson. *Automotive Industries*, v. 107, Sept. 15, 1952, p. 38-40.

Layout plan of heat treating department in transmissions operations of the Allison Division, General Motors Corp. (J general, ST)

252-J. The Theory & Practice of Nitriding. *Chemical Age*, v. 67, Sept. 6, 1952, p. 329-331.

Case hardening of special steels with nitrogen. (J28, ST)

253-J. Factors Influencing Pack Carburising. E. Mitchell. *Metallurgia*, v. 46, Aug. 1952, p. 61-72.

A series of tests to establish the effect of various factors, including temperature and amount and type of energizer, on nature of case obtained with both plain carbon and alloy case-hardening steels. Effect of dilution of carburizing compound, and a suggestion for a compound which will prevent formation of heavy carbide networks normally associated with heavily alloyed case hardening steels. Other factors influencing commercial pack carburizing process. Numerous photomicrographs of structure and tables. (J28, M27, CN, AY)

254-J. (Japanese.) **Quenching and Tempering of β-Tin Bronze.** Yoshikazu

Hosoi. *Nippon Kinzoku Gakkai-Si* (Journal of the Japan Institute of Metals), v. 16, Jan. 1952, p. 42-46.

Detailed experiments by means of electric resistance, hardness, and microscopic analyses. Tables, graphs, and micrographs.
(J26, J29, M27, P15, Q29, Cu)

255-J. (Japanese.) **Heat Treatment and Rate of Deformation of Various Different Punching-Die Steels.** Sadao Koshiba and Sukeo Nagashima. *Nippon Kinzoku Gakkai-Si* (Journal of the Japan Institute of Metals), v. 16, Jan. 1952, p. 56-60.

Hardness and rate of deformation due to heat treatment of various different punching-die steels was studied. Results are charted and tabulated. (J general, Q29, TS)

256-J. Low Frequency Induction Heating. H. N. Acker. *Canadian Metals,* v. 15, Sept. 1952, p. 22, 24.

Heating for forging of grinding balls and automotive parts; extrusion of nonferrous alloys; tempering of components prior to drawing; 1000-cycle induction heating for ferrous and nonferrous melting furnaces. (J2, F22, F24, J29, E10)

257-J. Continuous Annealing With Carbon Restoration. J. D. Armour. *Industrial Heating,* v. 19, Sept. 1952, p. 1586-1588, 1590, 1592, 1594, 1596, 1598, 1726-1729.

Continuous roller hearth carbon restoration furnace at Union Drawn Steel Div., Republic Steel Corp., Massillon, Ohio. Carbon restoration occurs during annealing. Theory and operation for carbon and alloy steel. Photomicrographs of structure, pre and post treatment.
(J23, M27, CN, AY)

258-J. Harden Cutting Edges and Increase Wear Resistance of All Types of Steel. E. M. Ellsworth. *Industry & Welding,* v. 25, Oct. 1952, p. 108, 111-113.

Results of using a compound which combines nitriding, carburizing, and chromizing in one operation. Pictorial evidence of results. Advantages and applications are given. (J28, L15, ST)

259-J. How to Heat Treat Aluminum. Floyd A. Lewis. *Materials & Methods,* v. 36, Sept. 1952, p. 99-103.

Survey includes preheating, annealing, solution heat treatment and aging, and equipment. Extensive table. (J general, Al)

260-J. (Japanese.) **The Decarburization of Iron and Steel. III. Decarburization and Degasification of Iron Plates.** Masuo Kawakami and Mayumi Someno. **IV. The Relationship Between Rate of Gas Extraction and Diffusion Constant of Carbon in Iron.** Mayumi Someno. *Nippon Kinzoku Gakkai-Si* (Journal of the Japan Institute of Metals), v. 16, Jan. 1952, p. 34-42.

Carbon-determination apparatus and procedure. Results of investigation on decarburization with wet and dry H_2. Rates of gas extraction were measured by two methods. Diffusion constant was calculated from these rates. Tables, graphs, and diagrams. (J28, N1, Fe, ST)

261-J. Why We Now Make Better Stainless Steels. J. J. Heger. *American Machinist,* v. 96, Oct. 13, 1952, p. 119-122.

Selection and heat treatment of stainless steels have been simplified by advances in steel melting practices and improved knowledge of heat treatment. Mechanical properties, weld tests and stress-relief. Future outlook in heat and corrosion resistant steels. Diagrams and graphs.
(J general, Q general, K9, SS)

262-J. How to Maintain Heat-Treating Equipment. T. A. Frischman. *American Machinist,* v. 96, Oct. 13, 1952, p. 135-146.

Suggestions for inspection and repairs to equipment which is subject to high temperature, corrosive gases, temperature changes, and thermal and mechanical stress. Tables and photographs. (J general)

263-J. Armor Plate Quenched Rapidly, Uniformly in Hydraulic Press. G. A. Leytze. *Iron Age,* v. 170, Oct. 16, p. 97-99.

Process as carried out by the Williamson Heater Co. (J26, AY)

264-J. Carburizing of Steels. John L. Everhart. *Materials & Methods,* v. 36, Oct. 1952, p. 135-150.

Carburizing methods, heat treatment after carburizing, properties of carburized steels, causes of defects, and applications. Photographs and graphs. (J28, AY)

265-J. Controlled Atmosphere Tempering. Harold N. Ipsen and Donald R. Mathews. *Metal Progress,* v. 62, Oct. 1952, p. 123-128.

Theoretical considerations involved, and desirable conditions to be striven for. Process and equipment for controlled oxidation as well as tempering. (J29, ST)

266-J. Compressed Air as Cooling Medium in Patenting Steel Wire. B. M. Pearson. *Wire Industry,* v. 19, Sept. 1952, p. 824, 827.

Recent progress in wire heat treatment techniques. (To be continued.) (J25, ST)

K

JOINING

721-K. Tractor Forgings Joined by Welding. Stephan Chmielewski. *Machinery* (American), v. 59, Sept. 1952, p. 190-191.

Welding of track roller halves by a 500 kva. butt-welder, and a track guide frame by manual arc welding. (K1)

722-K. Welded Frames Span 328′. *Architectural Forum,* v. 97, Sept. 1952, p. 158.

Mexico City's huge auditorium roof is supported by eight 260-ton 2-hinged rigid skipwelded frames whose tonnage was reduced 50% by welding. (K1, T26, ST)

723-K. Pressure Welding Makes Noiseless Track. *Canadian Metals,* v. 15, Sept. 1952, p. 54, 56.

Application in joining sections of railroad track. (K2, CN)

724-K. Welding and Welded Connections. W. Gerritsen. *Engineer,* v. 194, Sept. 19, 1952, p. 394-395. (A condensation.)

Principles and theory behind welding to produce more satisfactory designs. (K general)

725-K. Brazing Offers Economy in Making Aluminum Castings. William G. Gude. *Foundry,* v. 80, Oct. 1952, p. 124-125.

Method in which several simple Al castings are made and then brazed together to form the desired product. (K8, E general, Al)

726-K. Variations in Techniques for Welding Magnesium. Frank Charity. *Industry & Welding,* v. 24, Oct. 1952, p. 48-50, 53.

Inert-gas, arc welding, and resistance welding. Preparation and safety precautions, techniques, procedure for fillet welds, cleaning after welding, and inspection of welds.
(K1, K3, S13, Mg)

727-K. How to Improve Welding Production. Edmund Jacobson. *Industry & Welding,* v. 25, Oct. 1952, p. 60-62, 65-66, 146-147.

Proper cleaning of weldments before, during, and after manufacturing increases production and quality.
(K general, L12, CI)

728-K. How Plastic Tooling Aids Welding. Gilbert C. Close. *Industry & Welding,* v. 25, Oct. 1952, p. 68-69.

Use of plastics for welding jigs and check fixtures for welded components. (K general)

729-K. How To Spot Weld Aluminum to Air Force Specifications. H. J. Jacobson. *Industry & Welding,* v. 25, Oct. 1952, p. 70-72, 75, 150-151.

Efficient cleaning procedure and steps in running qualification tests.
(K3, Al)

730-K. A Report on Weldability of 8½% Nickel Steel. *Industry & Welding,* v. 25, Oct. 1952, p. 105-106.

Tests were run. Rods used were 25-20 Cr-Ni stainless steel and 80% Ni-Cr alloy. Butt welds were used. Results tabulated.
(K9, Ni, AY, SS)

731-K. It's Easy to Weld Stainless Steel. Howard E. Jackson. *Industry & Welding,* v. 25, Oct. 1952, p. 55-59, 130-131.

Processes of Rossoe Mfg. Co., of Seattle, for welding stainless steel oil-burning furnaces. Use of spot welding, two-wheel cart jig, and correct rod. Stages of welding and testing. (K3, K1, SS)

732-K. Automation Speeds Fuel Tank Assembly and Test. Herbert Chase. *Iron Age,* v. 170, Sept. 25, 1952, p. 122-124.

Procedures at Rouge plant, Ford Motor Co. Assembly operation is flexible enough to permit fabrication of different types of tanks on same line with only minor adjustments in procedure. Major joints are seam welded two sides at a time. (K general)

733-K. Submerged Arc Welding. O. M. Fromm. *Iron and Steel Engineer,* v. 29, Sept. 1952, p. 100-106.

The semi-automatic submerged-arc welding process as used in conjunction with jigs and positioners. (K1, ST)

734-K. Flash Welding Titanium Alloys. I. A. Oehler. *Materials & Methods,* v. 36, Sept. 1952, p. 206, 208, 210.

See abstract of "Titanium Alloys Flash Welded Easily", *Steel,* item 597-K, 1952. (K3, Ti)

735-K. Survey of Modern Theory on Welding and Weldability. (Concluded.) D. Seferian. *Sheet Metal Industries,* v. 29, Sept. 1952, p. 827-832, 840.

Electrodes—their manufacture by extrusion and dipping; operational characteristics; faults in coated electrodes; and classification. Selection of materials from which to manufacture electrodes, and effect of composition on the weld. Tables and photographs. (K9, T5)

736-K. Welded Girders Part of Huge Bridge Cranes. *Steel,* v. 131, Sept. 29, 1952, p. 86.

Girders for the two 350-ton bridge cranes under construction for McNary dam were fabricated largely by continuous seam welding at Willamette Iron & Steel Co., Portland, Ore. (K1, T26, ST)

737-K. Heavy Construction at Thorncliffe. *Welding and Metal Fabrication,* v. 20, Sept. 1952, p. 310-315.

Welding procedures at Newton Chambers Co., England, for construction of heavy engineering equipment. (K general, ST)

738-K. Pressure Vessel Conversion. J. K. Johannesen. *Welding and Metal Fabrication,* v. 20, Sept. 1952, p. 321-324.

Diagrams and table show how a used pressure vessel was converted for a new application. Butt welding was used for joining. (K1, ST)

739-K. Storage of Arc Welding Electrodes. *Welding and Metal Fabrication,* v. 20, Sept. 1952, p. 325.

Advantages of correct storage; heated and unheated dry-storage.
(K1)

740-K. Industrial Brazing. Part I and II. E. V. Beatson and H. R. Brooker. *Welding and Metal Fabrication*, v. 20, Aug. 1952, p. 293-298; Sept. 1952, p. 335-340.

Recommended procedures and applications, with emphasis on Cu brazing of ferrous metals. Part II: Furnace brazing with various alloys. Precautions for base metals of Cu and stainless steel. (K8, ST, Cu, SG-f)

741-K. Production Brazing. J. Raymond Wirt. *Welding Journal*, v. 31, Sept. 1952, p. 759-764.

Production brazing processes, brazing filler metals, and some specific application of furnace brazing and induction brazing. Wide variety of metals and alloys mentioned. Table and photographs. (K8, SG-f)

742-K. Observations on Experience With Welded Ships. David P. Brown. *Welding Journal*, v. 31, Sept. 1952, p. 765-782.

Background of experience acquired with welded construction in shipyards of the United States prior to war construction program, experience during program, and lessons learned from that experience. (K general, T22, ST)

743-K. The Arc Welding of Low Chromium-Molybdenum Steel Pipe. J. Bland, L. J. Privoznik, and F. J. Winsor. *Welding Journal*, v. 31, Sept. 1952, p. 783-790.

Comparison of low-hydrogen and cellulose-coated electrodes in welding two types of Cr-Mo steel pipe. Composition of weld metal and mechanical properties of the welds. Heat treatment in relation to stress relief. Tables and graphs. 10 ref. (K1, Q general, J1, AY)

744-K. Maintenance of Resistance Welders in High-Speed Assembly Lines. James F. Salatin and O. D. Etchison. *Welding Journal*, v. 31, Sept. 1952, p. 799-808.

Assembly of small electrical parts at high rates of speed involved a determination of the best method of accomplishing the job including equipment, determination of tolerances, provision for changing electrodes, electrical considerations, timers, and maintenance. (K3)

745-K. Welding Simplifies Drilling Mast Construction. Charles O. Planting. *Welding Journal*, v. 31, Sept. 1952, p. 810-813.

Use of welded construction by International Derrick and Equipment Co., Torrance, Calif. A low-alloy high-tensile steel is used. (K general, T28, AY)

746-K. All-Welded Steel Gondolas Built on Assembly Line. Howard B. Martin and Michael J. Zevada. *Welding Journal*, v. 31, Sept. 1952, p. 814-819.

Each car, built at Pullman-Standard Car Mfg. Co., Butler, Pa., requires a total of approximately 2600 lineal ft. of welding, including both manual shielded-arc and automatic hidden-arc machine welding. (K1, T23, ST)

747-K. Should Preheat be Substituted for High-Temperature Stress Relief in the Codes? E. Paul DeGarmo. *Welding Journal*, v. 31, Sept. 1952, p. 393s-396s.

Results of seven independent investigations show that 400° F. preheat is just as effective as 1200° F. stress-relief heat treatment in improving performance of low-carbon steel weldments, welded with AWS Type E6010 electrodes, for static and impact load conditions. Preliminary studies with small specimens of plain carbon steel indicate that preheat may not be quite as effective as stress relieving in case of fatigue. Tables and graphs. (K9, K1, J1, ST, CN)

748-K. The Strength and Ductility of Welds in Aluminum Alloy Plate. F. G. Nelson, Jr. and F. M. Howell. *Welding Journal*, v. 31, Sept. 1952, p. 397s-402s.

Data accumulated over a period of several years on plate welded by the argon-shielded tungsten-arc method and semi-automatic and automatic argon-shielded consumable-electrode methods. The data consist of tensile strength and free-bend elongation of butt welds and shear strength of longitudinal and transverse fillet welds. Tables and graphs. (K9, K1, Q23, Al)

749-K. Stresses in Circular-Patch Weld-Test Specimens. Alan V. Levy and Harry E. Kennedy. *Welding Journal*, v. 31, Sept. 1952, p. 402s-405s.

An investigation of the residual stresses in specimens of various plate and patch sizes using a hot rolled mild-steel plate as specimen source. Graphs and diagrams. (K9, Q25, ST)

750-K. Porosity in Mild Steel Weld Metal. Donald Warren and R. D. Stout. *Welding Journal*, v. 31, Sept. 1952, p. 406s-420s.

Among the factors investigated are: current density; travel speeds; carbon-oxygen reaction; electrode type; base plate deoxidation; ferromanganese additions; arc atmosphere; oxygen additions; oxide scale; cooling rate or base plate thickness; and multipass welds. The shielded inert-gas metallic arc process was used. Tables and photographs. (K1, ST)

751-K. Continuous Cooling Transformation of Weld Heat-Affected Zones. W. R. Apblett, L. K. Poole, and W. S. Pellini. *Welding Journal*, v. 31, Sept. 1952, p. 421s-430s.

A novel method for studying continuous cooling transformations that occur in the heat-affected zone of weldments. Significance of mode and type of transformation. TTT diagrams for Mn high-tensile steel (Navy Specification 48S5g). Three different types of transformation were noted. Photomicrographs, photographs, and graphs. (K9, N8, AY)

752-K. Chromium Recovery During Submerged-Arc Welding. James G. Kerr and David A. Elmer. *Welding Journal*, v. 31, Sept. 1952, p. 431s-438s.

Reactions in submerged-arc welding of stainless steel depend on flux composition and welding conditions. Best fluxes are low in Mn and Si and high in basic compounds. Photographs, tables, and graphs. 15 ref. (K1, SS)

753-K. The New Brown Boveri Welding Set. H. Kocher. *Brown Boveri Review*, v. 39, Apr. 1952, p. 128-134.

Excellent welding results, high efficiency, and extraordinary great mobility due to the light weight are claimed for a new patented design. The welding current can be infinitely regulated over a range of 1:10 without changing connections at the terminals, and remote position regulation can be provided if desired. Several sets can be operated in parallel without special arrangements. Tables, graphs, and illustrations. (K3)

754-K. Combinable Electronic Controls for Air-Operated Heavy-Duty Spot Welding Machines. E. Gut. *Brown Boveri Review*, v. 39, Apr. 1952, p. 135-f40.

A synchronous precision electronic control with various modified forms for practically all kinds of spot welding work. Diagram, table, and illustrations. (K3)

755-K. A Simple Electronic Weld Timer for Spot Welding Machines. G. Gerspacher. *Brown Boveri Review*, v. 39, Apr. 1952, p. 140-142.

Diagrams and illustrations. (K3)

756-K. A High-Conductivity Glass-To-Metal Seal. J. C. Turnbull. *RCA Review*, v. 13, Sept. 1952, p. 291-299.

Properties of high-conductivity seals using Kovar plated with Cu and Cr. Technique developed to reduce seal heating at high frequencies. Photomicrographs, tables, and diagrams. (K11, P15, Fe, Cu, Cr)

757-K. How to Pick the Right Welding Process. John J. Chyle. *SAE Journal*, v. 60, Oct. 1952, p. 30-38. (Excerpts from "Factors in the Selection of Welding Processes", John J. Chyle.)

Previously abstracted from *Machine Design*. See item 660-K, 1952. (K general)

758-K. Bronze Welding. A Review of Its History, Principles, Practice, and Applications. T. J. Palmer. *Sheet Metal Industries*, v. 29, Oct. 1952, p. 917-923. (K8, Cu)

759-K. A Shipyard Re-Organization for Welded Pre-Fabricated Construction. Clement Stephenson. *Transactions of the Institute of Welding*, v. 15, Aug. 1952, p. 101-111.

Layout reorganization at William Doxford & Sons, Ltd. Welding details and inspection. Diagrams and photographs. (K general, T26, ST)

760-K. Light Weight Welded Construction in Mechanical Engineering Structures. F. Koenigsberger. *Transactions of the Institute of Welding*, v. 15, Aug. 1952, p. 113-123.

Theoretical basis and practical approach. (K general, T26, ST)

761-K. Fabrication of Aircraft Undercarriages. *Welding and Metal Fabrication*, v. 20, July 1952, p. 242-245.

Use of oxy-acetylene pressure welding in the manufacture of aircraft landing gear at Monasco Mfg. Co., Burbank, Calif. In general, Cr-Mo and Ni-Cr-Mo low-alloy steels are used. (To be concluded.) (K2, AY)

762-K. How to Weld Stainless Steels. Lester F. Spencer. *Welding Engineer*, v. 37, Oct. 1952, p. 45-53.

Manual-arc, automatic-arc, inert-gas, gas, and atomic-hydrogen welding methods. Chrome-nickel and straight-chromium steels are dealt with. Corrosion resistance is mentioned and structure shown. Tables, diagrams, photographs, and micrographs. 12 ref. (K1, K2, SS)

763-K. Brazing of Stainless Steels. *Welding Engineer*, v. 37, Oct. 1952, p. 54.

Silver brazing techniques. (K8, SS)

764-K. Resistance Welding of Stainless Steels. Lester F. Spencer. *Welding Engineer*, v. 37, Oct. 1952, p. 55-59.

Welding procedures for austenitic stainless steel by spot, pulsation, projection, seam and roll-spot, and flash welding for butt joints. Tensile strengths and microstructure. Diagrams, photographs, tables, and micrographs. (K3, M27, Q27, SS)

765-K. Electrode Comparison Chart for Stainless-Steel Electrodes. *Welding Engineer*, v. 37, Oct. 1952, p. 73-75. (K1, SS)

766-K. Correlation of Weldability Tests With Structural Joints. Part III. Investigations With the Controlled Thermal Severity Test. C. L. M. Cottrell, M. D. Jackson, and J. G. Purchas. *Welding Research*, v. 6, June 1952, p. 50r-57r.

New weldability test for low-alloy steel is used to determine relative liability to hard-zone crack formation when any low-alloy steel is welded with any metal-arc welding electrode and to determine welding procedure which will give crack-free hard zones in a structural joint. General equation for calculating cooling rate is proposed and critical cooling rates are derived for a number of different types of electrode used for welding a low-alloy steel. Weldability index proposed for classifying low-alloy steels referring to hard-zone cracking. (K9, AY)

767-K. Some Suggested Causes of Porosity and Hot-Cracking in the

Metal-Arc Welding of Plain Carbon Steels. Arne Apold. *Welding Research*, v. 6, June 1952, p. 58r-66r. (Reprinted from *Sveiseteknikk*, Dec. 1950).

Reactions between slag and steel in terms of tendencies to approach chemical equilibrium. Typical cases of surface porosity. New theories of porosity. Influence of welding procedure factors and slag properties on porosity. Dependence of hot cracks on welding conditions. Influence of chemical elements on freedom of welds from hot cracking. Theories on causation of hot cracking. Experimental data. Photographs and tables. 29 ref. (K9, CN)

768-K. (Book.) **Automobile Body Reconditioning.** Theo. A. Wohlfeil, Erik E. Frisk, and A. B. Saxman. 157 pages. McGraw-Hill Book Co., 330 W. 42nd St., New York 18, N. Y. $3.60.

Purpose is to serve as a text, reference manual, or handbook in automobile body reconditioning. Oxyacetylene welding and sheet-metal straightening. (K2, G general)

769-K. (Book.) **Jefferson's Gas Welding Manual.** T. B. Jefferson. 112 pages. 1952. Associated Business Counselors, Skokie, Ill. $2.00.

Written for the reader who knows how to weld, and designed to fill gaps in his knowledge of various metals and processes. Beginners also can learn how to do simple gas welding and flame cutting. "Jiffy Welding Guides" are 20 separate sections of basic facts for joining any metal that is weldable by the oxy-acetylene process; the flame cutting of various metals covered in a similar series of guides; process selection, tip comparison charts. (K2, G22)

770-K. (Book.) **Welding and Riveting Larger Aluminium Structures.** P. L. Teed. 223 pages. 1952. Aluminium Development Association, 33 Grosvenor Street, W.1, London.

Contains four papers presented at the Aluminium Development Association symposium on welding and riveting of Al alloys, Nov. 1951. P. T. Houldcroft, W. G. Hull, and H. G. Taylor review current processes of arc welding in relation to certain specified aluminum alloys. J. R. Handforth deals with argon-arc process. J. C. Bailey reviews properties and driving of large Al alloy rivets, and S. C. Redshaw discusses design of riveted joints. (K general, Al)

771-K. (Book.) **Die Schweisstechnik des Bauingenieurs.** (Welding for Structural Engineers). **Ed. 2.** Bernhard Sahling and Kurt Latzin. 278 pages. 1952. Fried. Vieweg & Sohn, Braunschweig, Germany.

Practical introduction to planning, designing, producing, and testing welded joints in structural steel with special reference to official specifications. Weldable steels, the welding processes, shrinkage stresses and types of joints, and present methods of designing and producing plate girders, arches, pre-stressed concrete structures and tubular structures. Fabricating shop methods, welding in reinforced concrete construction, oxygen cutting, magnaflux and radiography, and important foreign welded bridges and buildings. (K general, T26, S22, ST)

L

CLEANING, COATING AND FINISHING

867-L. Photographic Reproduction on Aluminum by the "Fotoanodizado" and "Ricolor" Processes. J. M. Alemeda. *Electroplating and Metal Finishing*, v. 5, Sept. 1952, p. 286-288.

Two processes developed in laboratories of Marconi Espanola, S.A., Madrid, for reproducing photographs, etc. on anodized Al. The Fotoanodizado process is limited to blue, but some color variation is possible with the other process. Claimed to be cheaper, simpler, and more rapid than other processes. (L14, Al)

868-L. Finishing Zinc Base Die Castings. *Electroplating and Metal Finishing*, v. 5, Sept. 1952, p. 289, 291.

Based on a publication of Imperial Smelting Corp., Ltd. (L general, Zn)

869-L. Alternatives to Nickel-Chromium Plating. *Electroplating and Metal Finishing*, v. 5, Sept. 1952, p. 292-298.

Summary of papers presented at a recent conference sponsored by the Melbourne, Australia, branch of the American Electroplaters' Society. Topics include bright Zn plating; colorless lacquers; Cr plating with and without Ni undercoating; and periodic reverse current Cu plating. Brief notes are given on bright acid Cu; bright white brass; Sn-Zn; bronze; and Sn-Ni. (L17, Ni, Cr, Zn, Cu, Sn)

870-L. Metal Spraying in Russia. *Electroplating and Metal Finishing*, v. 5; *Metal Spraying*, v. 2, Sept. 1952, p. 315, 317-318. (Based on articles in *Stanki i Instrument*, 1951: No. 6, p. 38 and No. 11, p. 34)

New Russian spraying pistols: electric arc type EM-4; and low pressure acetylene type GIM-1. (L23)

871-L. Forging Dies Finished, Maintained by Wet Blasting. E. F. Anderson. *Iron Age*, v. 170, Sept. 18, 1952, p. 160-162.

Directional lines and grinding wheel snags are efficiently removed. Tolerances, sharp corners, and lines are not affected. The abrasive gets into areas inaccessible by hand, produces an easy-releasing matte finish. (L10, F22)

872-L. Felt for Metal Finishing and Polishing. Leon D. Gruberg. *Metal Finishing*, v. 50, Sept. 1952, p. 58-63.

See abstract, *Steel*, item 190-L, 1952. (L10, Al, Cu, SS)

873-L. Material Control in Nickel Chrome Plating. Robert T. Hood. *Metal Finishing*, v. 50, Sept. 1952, p. 64-66. (Reprinted from *Cost and Management*, Mar. 1952.)

Certain technical data in the process of nickel chrome plating make it possible to accurately apportion plating material as productive material rather than through arbitrary distribution of overhead. (L17, Ni, Cr)

874-L. White Brass Plating at Hamilton Mfg. Corp. C. C. Weekly. *Metal Finishing*, v. 50, Sept. 1952, p. 67-69.

Some experiences and findings at the above plant, Columbus, Indiana. Semi-automatic plating machines are used. Photographs. (L17, Cu)

875-L. Russians Claim Discovery of New Electroplating Method Using Alternating Current. *Metal Finishing*, v. 50, Sept. 1952, p. 69, 80.

A note based on an article in "Pravda." (L17)

876-L. The Metal Decorating Oven. C. H. Whitaker. *National Lithographer*, v. 59. Sept. 1952, p. 26-27, 86-89.

Factors involved in the development of the modern sheet oven. (L26)

877-L. Tin Plate. W. D. Poole. *National Lithographer*, v. 59, Sept. 1952, p. 28-31, 81-86.

The development of tin plate surfaces in use in metal decorating plants today. (L17)

878-L. Coatings. Henry Bates. *National Lithographer*, v. 59, Sept. 1952, p. 32-35, 89-90.

Sizing, coatings, inks, varnishes, and gold lacquer. (L26)

879-L. Rollers for Metal Decorating. Kenneth Butler. *National Lithographer*, v. 59, Sept. 1952, p. 36-37, 90-91

How various developments in manufacture of rollers have affected the metal decorating industry. (L26)

880-L. Solventless Wax-Resin Impregnants. Sam Ruggeri. *Paint and Varnish Production*, v. 42, Sept. 1952, p. 25-28.

Use in protecting electrical and electronic equipment from moisture and fungus growth. (L26)

881-L. Porcelain Enamels Vs. Organic Finishes. Philip Heiberger. *Paint and Varnish Production*, v. 42, Sept. 1952, p. 35-36, 81.

What porcelain is, how it is made, its advantages, restrictions, applications, and potentialities. (L27)

882-L. Phosphate Coating Progress 1945-52. A. R. King. *Paint Manufacture*, v. 22, Sept. 1952, p. 325-329.

Includes improved test methods and preparation of specifications, rapid iron phosphate treatments, derusting by phosphoric acid metal conditioners incorporating organic grease solvents and surface activators, and cold phosphating, especially for rusty surfaces. (To be concluded.) (L14)

883-L. Marine Paints: A Review of Recent Trends in Ship Coatings. *Paint Manufacture*, v. 22, Sept. 1952, p. 330-335.

Surveys various factors of fouling and corrosion together with development of marine coatings with specific qualities required for varying conditions found on ships. Surface preparation before paint application. Results of a series of efficiency tests. Future trends in marine paint field. (L26, R4, ST)

884-L. Ceramics Shrug Off Turbine's Tempest. *SAE Journal*, v. 60, Sept. 1952, p. 38-41. (Based on "Applications of Ceramic Coatings in Aircraft Engines", by John V. Long.)

Use of ceramic coatings to withstand heat and corrosion and to conserve critical materials. Test results on comparative oxidation rates of uncoated Inconel, uncoated AISI 321 stainless; and solaramic-coated 321; and on effect of corrosive agents on uncoated and solaramic-coated 321 stainless. (L27, R general, SS, Ni)

885-L. A Contribution to the Theory of Enamel Adherence. Morris Berg and Michael Humenik, Jr. *American Ceramic Society Bulletin*, v. 31, Sept. 1952, p. 329-331.

A study of the influence of reduced Co on glass-iron adherence by a quantitative determination of the force of adhesion at elevated temperatures. Role of a surface oxide layer on the Fe. Diagrams and micrographs. (L27, Fe)

886-L. How Friden Applies Solid-Film Lubricants. Fred Shear. *American Machinist*, v. 96, Sept. 29, 1952, p. 128-129.

Mechanized setup for finishing steel parts by applying a solid-film lubricant now in use by Friden Calculating Machine Co., Inc. This lubricant is rust resistant, has excellent antifriction properties, and retains its lubrication characteristics regardless of temperature. (L14, ST)

887-L. Flame-Plating Coats Metals With Carbide. *American Machinist*, v. 96, Sept. 29, 1952, p. 152-153.

New Linde process in which tungsten carbide is neither diluted nor alloyed with base metal. It can be applied to any metal in thicknesses from 0.0005 to 0.020 in. Bond is mechanical and similar to that created by metal spraying. (L22, C-n)

888-L. Ceramic Coatings for Civilian and Defense Products. *Finish*, v. 9, Oct. 1952, p. 38-39, 74.

New coatings used for domestic heating equipment and those applied to jet-engine components. (L27, SG-h)

889-L. Porcelain Enamel Institute Annual Shop Practice Forum. *Finish*, v. 9, Oct. 1952, p. 48-50, 52-54, 55.

Some reports from the above forum adapted for publication as follows: "Solving Seam Welding Problems", J. J. Baker; "Luminescent Porcelain Enamels," D. C. Bowman; "Spraying and Spray Equipment", Roy D. Beck; "New Pickling Compounds," James B. Willis; and "Stable Colors in Titania-Opacified Enamels", H. L. Launders. (L27)

890-L. Cleaning, Dow Treating and Finishing Magnesium Products. James D. Breneman. *Industrial Finishing*, v. 23, Sept. 1952, p. 20-22, 24, 26, 28, 30, 32, 34.

Chemical processes by which Northrop Aircraft cleans and coats Mg alloy parts to prevent corrosion. (L general, Mg)

891-L. Surface Treating Instrument Parts Under Automatic Control. William R. Sweet and Harold Twigg. *Industrial Finishing*, v. 28, Sept. 1952, p. 38-40, 42, 44.

Processes of cleaning and spray-finishing iron, steel, and Al parts to withstand extreme atmospheric conditions, dust, and corrosion. (L12, L26, R3, Fe, ST, Al)

892-L. "Take Painting to the Part", Lincoln Electric's System. Walter Rudolph. *Industrial Finishing*, v. 28, Sept. 1952, p. 58-60, 62, 66, 68.

Process by which parts are cleaned and painted at various mobile paint units on assembly line. Advantages. (L26, ST)

893-L. How Gas Plays an Important Part in Ups and Downs of Modern Living. Roy H. Minton. *Industrial Gas*. v. 31, Sept. 1952, p. 3-5.

Pictorial story of facilities installed at Otis Elevator Co. for finishing fabricated panels. (L general)

894-L. Plating: Making Metals Tougher. *Iron Age*, v. 170, Oct. 1952, p. 43.

See abstract of "Flame-Plating Coats Metals With Carbide", *American Machinist;* item 887-L, above. (L22, C-n)

895-L. Engineering Applications for Chromium Plating. Richard Wick. *Iron and Steel Engineer*, v. 29, Sept. 1952, p. 109-111.

Mechanical properties, specifications, production of Cr-plated machine elements, and use in maintenance. (L17, Q general, Cr)

896-L. Metallizing and Its Functions. B. Simon. *Iron and Steel Engineer*, v. 29, Sept. 1952, p. 112-113.

Fields in which metallizing is useful are corrosion, rebuilding worn parts and mis-machining. Preparation of surfaces is accomplished by sand blasting, grit blasting, and rough threading. Any metal except Cr may be used. (L23, L10)

897-L. New Process Permits Many Metals to be Tungsten Carbide Coated. *Journal of Metals*, v. 4, Oct. 1952, p. 1036-1037.

See abstract "Flame-Plating Coats Metals With Carbide," *American Machinist;* item 887-L, above. (L22, C-n)

898-L. Chemical and Anodic Treatments. (Concluded.) V. F. Henley. *Light Metals*, v. 15, June 1952, p. 184; July 1952, p. 220-221; Aug. 1952, p. 266-267; Sept. 1952, p. 284-285.

An annotated list of recent patents on electrobrightening and electropolishing; chemical brightening; anodizing; and after-treatment of oxide films. Considers anodizing patents published by the British Patents Office since 1946, and appraises their potential or known usefulness. (L19)

899-L. Epoxide Resin Coatings Have Excellent Chemical Resistance,

Adhesion, Abrasion Resistance. T. R. Hopper. *Materials & Methods,* v. 36, Sept. 1952, p. 90-93.

Properties of these coatings, and fields of applications including equipment, containers, and pipes. (L26)

900-L. Continuous Anodizing and Lacquering of Aluminium Strip. *Metal Industry,* v. 81, Sept. 12, 1952, p. 208-211.

The process with a description of Norwegian plant. Uses and properties of strip. Photographs and diagrams. (L19, L26, Al)

901-L. High Vacuum Metallizing. A. H. Hartman. *Modern Plastics,* v. 30, Oct. 1952, p. 115-116, 118.

As applied to plastics. Production of a suitable undercoat upon which metal is deposited by dipping in lacquer and baking; production of film by metal evaporation in a high vacuum; and providing a protective coating of baked lacquer over the metal film. Photographs. (L25)

902-L. The Significance of Tests on Collapsible Tube Finishes. D. F. Menard. *Paint, Oil, and Chemical Review,* v. 115, Sept. 25, 1952, p. 20-21. (L general)

903-L. Hot-Spray Finish Applied Under Varied Conditions. *Railway Age,* v. 133, Oct. 6, 1952, p. 106-107.

Hot-spray finish now being applied experimentally to freight cars. (L26)

904-L. New Finishes Give Refrigerator Parts Improved Runoff Properties. O. J. Spawn. *Refrigerating Engineering,* v. 60, Sept. 1952, p. 944-945.

Brief account of theory, and organic and silicone finishes. Influence of metal substrate. (L27)

905-L. Flame Plating: Wearing Parts Get Longer Lease on Life. *Steel,* v. 131, Sept. 29, 1952, p. 82-84, 86.

See abstract of "Flame Plating Coats Metals With Carbide", *American Machinist;* item 887-L, above. (L22, C-n)

906-L. Prevention of Marine Corrosion by Metallizing Systems. Howard Vanderpool. *Welding Journal,* v. 31, Sept. 1952, p. 791-798.

A method has been developed for spraying Zn or Al to protect marine equipment over a period of life of ships. This is used in conjunction with organic coatings. Case histories. (L23, ST, Zn, Al)

907-L. The Increasing-Load Wire Abrasion Tester. H. T. McLean. *Wire and Wire Products,* v. 27, Sept. 1952, p. 871-873, 928-929.

A method of testing abrasion resistance of magnet wire coatings that has increased accuracy and speed of testing and that provides manufacturer an important control on application of enamels to wire. Photographs, diagrams. (L26, Q9)

908-L. A Portuguese Wire Galvanising Plant. *Wire Industry,* v. 19, Sept. 1952, p. 828, 831-832.

New installation by Incandescent Heat Co. Ltd., Birmingham. (L16, CN, Zn)

909-L. Solar Expects Big Future for Coatings. *Ceramic Industry,* v. 59, Oct. 1952, p. 96-97, 99-100.

Method and use of ceramic coatings on high and low alloys in a range of temperatures up to 2000° F. for jet and reciprocating engines. (L27, SS, SG-h)

910-L. Brassfoundry Finishing Methods. F. Wild. *Foundry Trade Journal,* v. 93, Oct. 2, 1952, p. 393-396, 400.

Methods and machinery for performing intermediate and final operations on general brass-foundry components including electrolytic and chemical polishing, bright dipping, degreasing and chemical cleaning, plating, coating, and lacquering. (L general, Cu)

911-L. Tin and Its Alloys. Robert J. Nekervis. *Industrial and Engineering Chemistry,* v. 44, Oct. 1952, p. 2360-2364.

Annual construction-materials review. Tin alloy electroplating, electrotinning and immersion tinning practice, corrosion resistance of tinplate containers, corrosion resistance of other tin coatings, hot-dip coating, soft solders, and tin-containing materials. 102 ref. (L16, L17, Sn)

912-L. Adhesion of Lacquers to Nonferrous Metals. L. Reed Brantley, Arthur Woodward, and Gordon Carpenter. *Industrial and Engineering Chemistry,* v. 44, Oct. 1952, p. 2386-2389.

The Adherometer which is used to study the nature of adhesion of organic coatings to nonferrous metals. Factors responsible for adhesion of nitrocellulose and ethylcellulose lacquers to Al were investigated. Optimum dibutyl phthalate plasticizer content for adhesion is reported. Tables, diagrams, and graphs. 21 ref. (L26, Al, EG-a)

913-L. Anticorrosive Primers; Pigments and Vehicles Applicable to Magnesium. Allen L. Alexander, Harold J. E. Segrave, Rodger Freriks, and J. E. Cowling. *Industrial and Engineering Chemistry,* v. 44, Oct. 1952, p. 2409-2414.

Investigation to develop more effective inhibitive organic coatings for Mg. Tables. 11 ref. (L26, Mg)

914-L. The Nature of the Film Present on Iron After Brightening in Marshall's Solution. A. Hickling, W. A. Marshall, and E. R. Buckle. *Journal of the Electrodepositors' Technical Society,* v. 28, 1952, p. 47-60; disc., p. 61-68. (Preprint.)

Evidence indicates that the film consists of a very thin but tenacious and continuous layer of oxide. By reducing film cathodically in an NH_4Cl electrolyte and observing quantity of electricity involved, thickness of film was estimated and found to be of the order of 60 Å. (L25, S14, Fe)

915-L. Finishes for Communications Equipment With Special Reference to Electroplate Coatings. E. C. J. Marsh. *Journal of the Electrodepositors' Technical Society,* v. 28, 1952, p. 69-88. (Preprint.)

A general treatment, avoiding technical details. (L17)

916-L. Thin, Ductile Carbide Coatings Possible With New Method. F. E. King. *Materials & Methods,* v. 36, Oct. 1952, p. 112-114.

See abstract of "Flame-Plating Coats Metals With Carbide". *American Machinist;* item 887-L, 1952. (L22, C-n)

917-L. Chromium-and-Glass High-Temperature Coatings for Molybdenum. *Metal Finishing,* v. 50, Oct. 1952, p. 61.

See abstract of "Study of Chromium-Frit-Type Coatings for High Temperature Protection of Molybdenum." D. G. Moore, L. H. Bolz, J. W. Pitts, and W. N. Harrison. National Advisory Committee for Aeronautics, Technical Note 2422; item 608-L, 1951. (L27, Mo)

918-L. Finishing Magnesium. John Starr. *Metal Finishing,* v. 50, Oct. 1952, p. 62-64.

Preparation of Mg for finishing, use of chemical treatments, and organic coatings. (L14, L26, Mg)

919-L. Anodizing Aluminum With Sulfamic Acid: Comparison of Sulfuric, Oxalic and Sulfamic Acid Processes. Sakae Tajima, Yasuyuki Kimura, and Toshiro Fukushima. *Metal Finishing,* v. 50, Oct. 1952, p. 67-71.

Experimental procedure and results. Data on resistance to abrasion and corrosion. Diagrams and graphs. (L19, R general, Q9, Al)

920-L. Alkali Cleaner "Life". H. K. Hunt. *Metal Finishing,* v. 50, Oct. 1952, p. 72-73.

Chemical and physical factors; saponification, conversion to carbonates, dirt load, drag-out, volume of solution, and adsorption which can alter the life of a metal cleaner. (L12)

921-L. Acid Pickling Solutions. E. E. Halls. *Metal Finishing,* v. 50, Oct. 1952, p. 74-78, 81.

Previously abstracted from "A Study of Acid Pickling Solutions For Wrought Iron and Steel With Special Reference to Use of Inhibitors", *Electroplating and Metal Finishing;* item 527-L, 1952. (L12, Fe, ST)

922-L. Air Agitation: Its Effects in Sulphuric Acid Anodizing. R. C. Spooner. *Metal Industry,* v. 81, Sept. 26, 1952, p. 248-250.

Experiments which show how air agitation influences current density and film thickness in anodizing Al. Diagrams and tables. (L19, Al)

923-L. Abrasive Tumbling Gives Precision Finishes Economically. Allen G. Gray. *Metal Progress,* v. 62, Oct. 1, 1952, p. 104-108.

Procedures and equipment. Typical applications to small parts. (L10)

924-L. Increasing Copper Content in White Brass and Copper Cyanide Solutions by Electrolytic Regeneration. Walter R. Binai. *Plating,* v. 39, Oct. 1952, p. 1120-1121, 1131.

New method of introducing Cu to the plating solution without addition of copper cyanide or copper cyanide concentrate which is accomplished by an electrolytic regeneration cell. Diagrams. (L17, Cu)

925-L. Copper Striking on Zinc Base Die-Castings. Irwin K. Hauseman. *Plating,* v. 39, Oct. 1952, p. 1125-1126, 1131.

How problems encountered in plating Zn die castings by one job shop were solved. Intensive studies relating to Cu striking problems over a 6-year period. Different types of faulty plating and their remedies. (L17, Cu, Zn)

926-L. Colourless Lacquers. J. Towner. *Plating Notes,* v. 4, June 1952, p. 87-90; disc., p. 91-96.

Available types and their application for protection of Cr and bright Zn finishes. (L26, Cr, Zn)

927-L. Bright Zinc Plating. R. D. Taylor. *Plating Notes,* v. 4, June 1952, p. 74-83; disc., p. 91-96.

Corrosion resistance and appearance ratings of types of Zn finish; cyanide bath formula and bath control; bright dipping solutions with a detailed coverage of chromate finishing; corrosion resistance of bright Zn; and application. (L16, L17, R general, Zn, Cr)

928-L. Practical Experiences With Bright Zinc Plating. A. Chesterfield. *Plating Notes,* v. 4, June 1952, p. 84-86; disc., p. 91-96.

For practical man engaged in plating bright zinc. Equipment, costs, and composition and control of plating and bright dipping solutions. (L16, L17, Zn, Cr)

929-L. Chromium Plating With or Without Undercoats. Introduction. J. J. Dale. *Plating Notes,* v. 4, June 1952, p. 97-99.

As a basis for subsequent conference papers, reviews briefly what is known of the performance of chromium when used in decorative and protective coatings. Data for ferroxyl-type porosity tests. (L17, Cr, Ni, Zn)

930-L. Practical Experiences With Chromium Without Nickel Undercoats. D. Cam. *Plating Notes,* v. 4, June 1952, p. 100-101; disc., p. 105-106.

Use of a special proprietary "cold" Cr solution. Properties of coatings, and corrosion tests for Cr over brass and Cr-Zn over steel. (L17, R11, Cr, Zn, Cu, ST)

931-L. A Report on Periodic Reverse Current Copper Plating. H. J. Merton. *Plating Notes,* v. 4, June 1952, p. 102-104; disc., p. 105-106.

P. R. cycle, current density, agitation and filtration, solution composition, applications, and corrosion resistance of Cu, Cr-Cu, and Ni-Cu on Zn alloys.
(L17, R general, Cu, Cr, Ni, Zn)

932-L. Third Technical Session (Conference on Nickel Alternatives.) *Plating Notes,* v. 4, June 1952, p. 107-113.
Information, including formulas, on bright Zn, bright acid Cu, and white brass plating; on bronze as an undercoat for Cr; on Sn coatings. Includes discussion.
(L17, Zn, Cu, Sn, Cr)

933-L. The Contamination in Evaporated Films by the Material of the Source. O. S. Heavens. *Proceedings of the Physical Society,* v. 65, sec. B, Oct. 1, 1952, p. 788-793.
Methods to detect contamination of films of Ag or Ge by boats or filaments of W, Mo, or Ta used as sources. For tests at pressures down to 5×10^{-6} mm. Hg, a metal system employing an oil diffusion pump was used; for pressures down to 10^{-7} mm. Hg, a glass system with a mercury pump and solid CO_2 + acetone was used. Tables. (L25, Ag, Ge)

934-L. More About Ceramic Coatings. *Product Engineering,* v. 23, Oct. 1952, p. 134-141.
National Bureau of Standards and proprietary coatings. Newer types of ceramic coatings for high-temperature alloys, ceramals, Mo, and resistance-wire strain gages. Photographs and tables. (L27, SG-h, Mo)

935-L. Surface Treatment and Finishing of Light Metals: Part 7. S. Wernick and R. Pinner. *Sheet Metal Industries,* v. 29, Sept. 1952, p. 843-854.
Series is continued from Oct. 1951 issue. Coloring, photographic processes, and sealing. Tables and graphs. (To be continued.)
(L14, EG-a)

936-L. The Surface Treatment of Ferrous Metals Prior to Painting. H. J. Testro. *Sheet Metal Industries,* v. 29, Oct. 1952, p. 931-940.
Abrasive methods (manual and mechanical), tumbling, dry blasting, vapor blasting, solvent cleaning, acid pickling, alkaline pickling, emulsion cleaning, electrolytic cleaning, phosphating, galvanizing, Sherardizing, tin and terneplate, and metal spraying. (L general, Fe, ST)

937-L. The Mechanical Surface Finishing of Metals. (Continued.) G. T. Colegate. *Sheet Metal Industries,* v. 29, Oct. 1952, p. 941-948.
Polishing the specific metals, steel, cast iron, stainless steel, Mg alloys, Monel, Al, nickel silver, solid Ni, Cu, brass stampings, solid Ag, Au, Pt, Pd, Zn-base die castings, and Britannia metal and pewter. Polishing electrodeposits is included. (To be continued.) (L10)

938-L. Flame Plating Applies Metal Coatings. *Tool Engineer,* v. 29, Oct. 1952, p. 96-99.
See abstract, "Flame-Plating Coats Metals With Carbide", *American Machinist:* item 887-L, 1952.
(L22, C-n)

939-L. Cleaning Stainless Before and After Welding. *Welding Engineer,* v. 37, Oct. 1952, p. 60-61.
Emphasis on good housekeeping procedures to eliminate preweld cleaning. Methods of cleaning are by wire brush, chemicals, and sand blasting. Need of cleaning for brazing and post-welds.
(L10, L12, K general, SS)

940-L. (Book.) **Encyclopedia of Surface-Active Agents. Rev. Ed.** J. P. Sisley and P. J. Wood. 540 pages. 1952. Chemical Publishing Co., 212 Fifth Ave., New York 10, N. Y. $15.00.
Part 1: General aspects of surface-active agents, their properties, applications, and methods of manufacture. System of classification. Applications in various industries including treatment of metals, surface coatings, flotation reagents, cutting and soluble oils. Part 2: A compilation of data on all major commercially available surface-active agents which appeared on the world market up to the publication of the book. (L general, B14, G21)

M
METALLOGRAPHY, CONSTITUTION AND PRIMARY STRUCTURES

419-M. Plastic Deformation Features on Cleavage Surfaces of Metal Crystals. J. Holden. *Philosophical Magazine,* ser. 7, v. 43, Sept. 1952, p. 976-984.
Surface measurements were made on kink bands, twin bands, and bend planes produced in specimens cleaved from single crystals of Zn, Mg, Bi, and Sb. Microscopic structure of kink bands and polygonization structures produced by inhomogeneous deformation followed by annealing are illustrated.
(Q24, Zn, Bi, Mg, Sb)

420-M. (German.) **Structure of Amorphous Selenium.** H. Richter, W. Kulcke, and H. Specht. *Zeitschrift für Naturforschung,* v. 7a, Aug. 1952, p. 511-532.
Procedure for preparing and X-raying amorphous selenium. Heating was found to convert it directly but partially into crystalline Se. Diagrams, graphs, tables, photographs, and X-ray pictures. 35 ref. (M26, Se)

421-M. (Japanese.) **Kossel Pattern Produced by the Capillary X-Ray Tube and Its Application.** Tohoru Imura. *Nippon Kinzoku Gakkai-Si* (Journal of the Japan Institute of Metals), v. 16, Jan. 1952, p. 10-15.
Using a new type of capillary X-ray tube, characteristic diffraction patterns were obtained for a single-crystal Al plate, using both transmission and reflection and Cu-$K\alpha$ radiation. Lattice dimensions were determined very accurately.
(M22, Al)

422-M. (Japanese.) **Abnormal Structure in Alloys of the Eutectic or Eutectoid Type. IV. Abnormal Structure of the Ternary Eutectic. Appendix. The Eutectic or Eutectoid Structure.** Kyuya Nagasaki. *Nippon Kinzoku Gakkai-Si* (Journal of the Japan Institute of Metals), v. 16, Jan. 1952, p. 23-26.
A theoretical analysis, confirmed by results of experiments on a Cd-Bi-Sn alloy. Graphs and photomicrographs. (M27, Cd, Bi, Sn)

423-M. Markings Found in the Oxide Replicas for Electron Microscopy. Shiegeto Yamaguchi. *Journal of Applied Physics,* v. 23, Sept. 1952, p. 935-936.
Experimental results from literature. Two types of crystal edges are found in electron micrographs of oxide replicas of metals. Mentions Fe, Al, Permalloy, and steels.
(M21, Al, Fe, Ni, ST)

424-M. On the Metallic Shadow-Casting Using a Nozzle System. Tadatosi Hibi. *Journal of Applied Physics,* v. 23, Sept. 1952, p. 957-963.
Previously abstracted from *Review of Scientific Instruments;* see item 332-M, 1952. (M23)

425-M. The Effect of Accelerating Voltage and Specimen Morphology on Electron Diffraction Patterns. S. G. Ellis. *Journal of Applied Physics,* v. 23, Sept. 1952, p. 1024-1028.
Using empirical relations established in study of electron diffraction patterns of uniform thin films of aluminum, contrast between the most intense ring and background is calculated for other morphologies as a function of accelerating voltage on the camera. (M22, Al)

426-M. Phase Equilibrium Investigation of the Na_2O-P_2O_5-SiO_2 Ternary System, E. T. Turkdogan. *Journal of the Iron and Steel Institute,* v. 172, Sept. 1952, p. 1-15.
Part of an investigation of phase distribution in sodium oxide-bearing slags. Systems established by thermal analysis, specific gravity, and microscopic and X-ray determination. Binary and ternary phase-equilibrium diagrams produced are conclusions of present investigation. Tables, photomicrographs, and numerous diagrams. (M24, B21)

427-M. Identification of Certain Iron-Silicon Carbides. W. S. Owen and B. G. Street. *Journal of the Iron and Steel Institute,* v. 172, Sept. 1952, p. 15-18.
X-ray diffraction and microscopic work designed to obtain further information about supposed Fe-Si carbides. Variously prepared Fe-C-Si alloys were used. Photomicrographs and tables. 10 ref.
(M21, M22, Fe, C-n)

428-M. Tungsten-Cobalt-Carbon System. Pekka Rautala and John T. Norton. *Journal of Metals,* v. 4, Oct. 1952; *Transactions of American Society of Mechanical Engineers,* v. 194, 1952, p. 1045-1050.
The phases and equilibria in the W-Co-C system were studied by X-ray diffraction methods, metallographic techniques, and thermal analysis. Reactions leading to different phases were explained and tentative diagrams of stable and metastable equilibria proposed. Basic reactions in sintering. Graphs and diagram.
(M24, W, Co)

429-M. Role of the Binder Phase in Cemented Tungsten Carbide-Cobalt Alloys. Joseph Gurland and John T. Norton. *Journal of Metals,* v. 4, Oct. 1952; *Transactions of American Society of Mechanical Engineers,* v. 194, 1952, p. 1051-1056.
Experiments to determine whether sintering of tungsten carbide-cobalt alloys leads to formation of a carbide skeleton or whether densification behavior and properties of cemented compacts are consistent with a structure of isolated carbide grains, in a matrix of binder metal. Graphs and micrographs. 15 ref.
(M27, H15, W, C-n, Co)

430-M. Intermediate Phases in the Mo-Fe-Co, Mo-Fe-Ni, and Mo-Ni-Co Ternary Systems. D. K. Das, S. P. Rideout, and Paul A. Beck. *Journal of Metals,* v. 4, Oct. 1952; *Transactions of American Society of Mechanical Engineers,* v. 194, 1952, p. 1071-1075.
Investigation concerned with the 1200° C. isothermal sections of above ternary systems. Diagrams and micrographs. 23 ref.
(M24, Mo, Fe, Ni, Co)

431-M. Copper-Zinc Constitution Diagram, Redetermined in the Vicinity of the Beta Phase by Means of Quantitative Metallography. Lilian Heikkinen Beck and Cyril Stanley Smith. *Journal of Metals,* v. 4, Oct. 1952; *Transactions of American Society of Mechanical Engineers,* v. 194, 1952, p. 1079-1083.
By quantitative microscopic measurement of areas of each constituent in well-annealed 2-phase alloys, and by precise measurement of lattice parameters, $\alpha + \beta$ and $\beta + \gamma$ fields were redetermined down to temperatures of 250° C. Tables and diagrams. (M24, Cu, Zn)

432-M. Laue Asterism and Deformation Bands. E. A. Calnan. *Acta Crystallographica,* v. 5, Sept. 10, 1952, p. 557-563.
Nature of lamellar regions in relation to current ideas on inhomogeneous deformation. Experimental data using Al crystals. Micrographs,

diffraction patterns and tables. 24 ref. (M22, Al)

433-M. The Use of the Three-Stage Electron Microscope in Crystal-Structure Analysis. J. F. Brown and D. Clark. *Acta Crystallographica,* v. 5, Sept. 10, 1952, p. 615-619.

Application of electron diffraction to unsolved structure problems, particularly in those cases where X-ray methods by themselves have failed. Two examples show how these single-crystal diffraction patterns can be used to obtain valuable crystallographic information concerning unit-cell size and symmetry. The work is carried out on σ phase and carbide residues obtained from stainless steels. Photomicrographs and tables. 14 ref. (M26)

434-M. The Interpretation of Diffuse X-Ray Reflections From Single Crystals. J. Hoerni and W. A. Wooster. *Acta Crystallographica,* v. 5, Sept. 10, 1952, p. 626-630.

Construction and use of charts whereby angular coordinates of any line in reciprocal space passing through a reciprocal point near to the sphere of reflection can be found, and giving distance from same reciprocal point of intersection of this line with the reflecting sphere. Methods for using Laue and Bragg reflections to locate the charts correctly with respect to an enlarged drawing of the diffuse spot. (M22)

435-M. Interatomic Distances and Atomic Valences in $NaZn_{13}$. David P. Shoemaker, Richard E. Marsh, Fred J. Ewing, and Linus Pauling. *Acta Crystallographica,* v. 5, Sept. 10, 1952, p. 637-644.

Theoretical study undertaken to provide unit-cell and positional parameters and interatomic distances with sufficient precision for a satisfactory interpretation of above structure in terms of atomic valence and bond numbers. (M25, Zn)

436-M. Crystal Chemical Studies of the 5f-Series of Elements. XVII. The Crystal Structure of Neptunium Metal. XVIII. Crystal Structure Studies of Neptunium Metal at Elevated Temperatures. W. H. Zachariasen. *Acta Crystallographica,* v. 5, Sept. 10, 1952, p. 660-667.

Part XVII: Crystal structure of neptunium metal at room temperature. Part XVIII: Crystal structure studies in range from room temperature to melting point, which is at 640° C. Tables. (M26, Np)

437-M. Fourier Strips at a 3° Interval. C. A. Beevers. *Acta Crystallographica,* v. 5, Sept. 10, 1952, p. 670-673.

Production of a new set of Fourier strips to an interval of 3°. Author believes this set will be of considerable service in structure-factor calculation as well as in computation of electron-density and Patterson maps, and in calculation of molecular Fourier transforms. 11 ref. (M22)

438-M. The Use of Fourier Strips for Calculating Structure Factors. C. A. Beevers and H. Lipson. *Acta Crystallographica,* v. 5, Sept. 10, 1952, p. 673-675.

Accuracy of the method and some examples of procedure involved. Tables. (M22)

439-M. Crystal Gazing With X-Rays. *Chemical and Engineering News,* v. 30, Oct. 20, 1952, p. 4356-4363.

History, theory, and equipment used in determining structures of crystals. Fourier synthesis and Patterson analysis. Photographs and diagrams. (M26)

440-M. Electron Diffraction and Grinding of Metals. R. Courtel. *Industrial Diamond Review,* new ser., v. 12, Sept. 1952, p. 196-200. (Translated and condensed from *Metaux et Corrosion,* v. 25, May 1950, p. 117-125; June 1950, p. 145-155; July-Aug. 1950, p. 188-199.)

Previously abstracted from original under slightly different titles. See items 280-M and 159-C, 1950. (M22, E25, C25)

441-M. The Constitution of Nickel-Rich Alloys of the Nickel-Titanium-Aluminium System. A. Taylor and R. W. Floyd. *Journal of the Institute of Metals,* v. 81, Sept. 1952, p. 25-32.

Equilibrium relationships of the above over the range 750-1150° C. were determined by a combination of micrographic and X-ray-diffraction techniques. Tables, phase diagrams, and photomicrographs. (M24, Ni, Al, Ti)

442-M. Distribution Equilibria in Some Ternary Systems Me_1-Me_2-B and the Relative Strength of the Transition-Metal-Boron Bond. G. Hägg and R. Kiessling. *Journal of the Institute of Metals,* v. 81, Sept. 1952, p. 57-60.

In ternary systems Me_1-Me_2-B, where Me_1 and Me_2 both belong to 1st series of transition metals, distribution of metals between 2 phases $(Me_1, Me_2)_2B$ and $(Me_1, Me_2)B$ in equilibrium with each other has been determined by X-ray methods. Metal with lower atomic number is always concentrated in phase richest in boron. Tables and phase diagrams. (M24)

443-M. Identification of Fractures in Cast Magnesium Alloys. P. F. George and H. A. Diehl. *Metal Progress,* v. 62, Oct. 1952, p. 96-B, 121-122.

Use of visual, macro, and microexamination to identify fracture types. (M27, M28, Q26, Mg)

444-M. (Book.) **Atomic Theory for Students of Metallurgy. Ed. 2.** William Hume-Rothery. 331 pages. 1952. Institute of Metals, 4 Grosvenor Gardens, London S.W.7, England. $3.00.

Chapters are grouped under the following headings: The general background; the structure of the free atom; assemblies of atoms; the free-electron theory of metals; the Brillouin-zone theory of metals; and electrons, atoms, metals, and alloys. (M25)

445-M. (Book.) **Fundamentals of Physical Metallurgy.** Ralph Hultgren. 395 pages. Prentice-Hall, Inc., 70 Fifth Ave., New York 11, N. Y. $9.35.

Explains phase reactions predicted from phase diagrams. Effects of microstructure on mechanical properties of alloys. Modern theory of martensite formation, dislocation theory, future of titanium, laws of metallic crystal chemistry, deformation, and recrystallization. (M24, M26, M27, N8, N5, Q24)

446-M. (Book.) **X-Ray Analysis of Crystals.** J. M. Bijvoet, A. H. Kolkmeyer and C. H. MacGillavry. 304 pages. 1951. Butterworths Scientific Publications, 4-6 Bell Yard, Temple Bar, London W.C.2, England. 50s.

General aspects. Nine appendices. (M26, M22)

447-M. (Book.) (German.) **Atlas Metallographicus. Band 3. Teil 2. Ternäre Legierungen des Aluminiums; Beispiele für die Kristallisation Ternärer Systeme.** (Metallographic Atlas. Vol. 3. Part 2. Ternary Alloys of Aluminum; Examples of the Crystallization of Ternary Systems.) Heinrich Hanemann and Angelica Schrader. 170 pages. 1952. Verlag Stahleisen M.B.H., Breite Strasse 27, Postschliessfach 2590, Dusseldorf, Germany. 80 DM.

A comprehensive reference work covering work done on more than 3000 alloys. 502 illus. (M24, Al)

N

TRANSFORMATIONS AND RESULTING STRUCTURES

284-N. The Growth of Crystals of the Hexagonal Metals From Their Vapours. A. J. Forty. *Philosophical Magazine,* ser. 7, v. 43, Sept. 1952, p. 949-957.

Techniques for preparation of well-developed growth surfaces of crystals of hexagonal metals Mg, Zn, Cd. Possibilities of performing plastic deformation experiments with these crystals. (N12, Q24, Mg, Zn, Cd)

285-N. The Formation of Order in the Alloy $AuCu_3$. I. G. Edmunds and R. M. Hinde. *Proceedings of the Physical Society,* v. 65, sec. B, Sept. 1, 1952, p. 716-730.

The approach to order in $AuCu_3$ was studied by X-ray examination of single crystals. Distribution of intensity in diffuse superlattice reflections was measured from a series of photographs of a stationary crystal, and again from a moving-film photograph, effect of instrumental broadening being eliminated by Stokes' method. Tables, diagrams, and graphs. 13 ref. (N10, Au, Cu)

286-N. (English.) **Calorimetric Study of the Precipitation of Carbon Dissolved in α-Iron.** G. Borelius and Stig Berglund. *Arkiv för Fysik,* v. 4, no. 1-2, 1952, p. 173-182.

Specimens of technically pure Fe with small C contents were heated at various temperatures between 350 and 700° C. in order to obtain the corresponding equilibrium between C in solution in α-Fe and in cementite, Fe_3C. They were then quenched to 0° C. During aging, the power of the heat evolved by precipitation of C as carbide was measured as a function of time and by integrating the power-time curves, the total amounts of heat were computed. Heat of solution and carbon solubilities. Tables and graphs. (N7, Fe)

287-N. (English.) **Study on the Recrystallization Temperature of Refined High Purity Aluminium. III. The Effect of Small Amounts of Impurities.** Namio Kawashima and Yuzo Nakamura. *Nippon Kinzoku Gakkai-Si* (Journal of the Japan Institute of Metals), v. 16, Jan. 1952, p. 26-29.

By means of X-ray analysis it was found that small addition of Cu, Mg, Zn, Si, Mn, and Ti within their solubility limit increased the beginning temperature of the recrystallization, but Fe lowered it. (N5, Al)

288-N. (German.) **Constitution Research as a Basis for the Heat Treatment of Steels.** Adolf Rose and Peter Walter. *Stahl und Eisen,* v. 72, Aug. 28, 1952, p. 1063-1074; disc., p. 1074-1075.

Limited significance of equilibrium studies to hardening and heat treating of steels; representation of austenite transformation as dependent on time and temperature with undercooling; principal effect of carbon and alloying elements on transformation within pearlite and intermediate phases; and necessity for further fundamental research in order to determine relations between equilibrium and nonequilibrium conditions. Graphs and micrographs. 18 ref. (N8, ST)

289-N. (Japanese.) **The Allotropic Transformation of Metallic Selenium. I and II.** Sueo Yamamori. *Nippon Kinzoku Gakkai-Si* (Journal of the Japan Institute of Metals), v. 16, Jan. 1952, p. 1-10.

Experiments were conducted, using qualitative measurements of temperature dependence of conductivity, and by differential thermal analysis. In addition, electrical properties of monoclinic Se were studied. In Part II, conductivity of metallic Se was qualitatively investigated as a function of temperature of metallizing. It was found that there are different types of conductivity-temperature curves, the main difference between them being due to existence of the monoclinic modification mixed with hexagonal Se. Graphs and photomicrographs. (N6, P11, Se)

290-N. Self-Diffusion in Pure Polycrystalline Silver. L. Slifkin, D. Lazarus, and T. Tomizuka. *Journal of Applied Physics,* v. 23, Sept. 1952, p. 1032-1034.

A study using Ag^{110} as a tracer, over the range 450-936° C. Table and graphs. (N1, Ag)

291-N. The Kirkendall Effect in Alloy Systems. Herbert N. Hersh. *Journal of Applied Physics,* v. 23, Sept. 1952, p. 1055-1056.

Purpose of study was to investigate and determine nature of forces acting within diffusion zone which cause Kirkendall effect. Utilizes a dezincification of brass and measurement of dimensional changes. Table and graph. (N1, Cu)

292-N. Discussion at the Annual General Meeting, 1952: "Hydrogen in Steel". *Journal of the Iron and Steel Institute,* v. 172, Sept. 1952, p. 46-51.

Joint discussion on the following papers published in earlier issues of this journal: "The Determination of Hydrogen in Liquid Steel", R. M. Cook and J. D. Hobson; "Diffusion of Hydrogen in Iron and Iron Alloys at Elevated Temperatures", P. L. Chang and W. D. G. Bennett; "Distribution of Hydrogen in Large Ingots and Forgings", J. D. Hobson and C. Sykes; and "The Effect of Hydrogen on the Properties of Low-Alloy Steel," J. D. Hobson and C. Sykes. Diagrams. (N1, D9, Q general, ST, Fe, AY)

293-N. On the Reversal of the Strain-Induced Martensitic Transformation in the Copper-Zinc System. J. E. Reynolds, Jr., and M. B. Bever. *Journal of Metals,* v. 4, Oct. 1952; *Transactions of American Society of Mechanical Engineers,* v. 194, 1952, p. 1065-1066.

Shows that martensitic transformations are thermally reversible, although hysteresis may be involved. Micrographs. (N9, Cu, Zn)

294-N. Diffusion of Silicon in Iron. W. Batz, H. W. Mead, and C. E. Birchenall. *Journal of Metals,* v. 4, Oct. 1952; *Transactions of American Society of Mechanical Engineers,* v. 194, 1952, p. 1070.

Briefly describes experiments. (N1, Fe)

295-N. An Automatic Surface Follower for Measuring the Rate of Evaporation of Molten Metals Undergoing Vacuum Distillation. M. J. Spendlove and H. W. St. Clair. *Review of Scientific Instruments,* v. 23, Sept. 1952, p. 471-475.

Instruments which measure continuously rate of evaporation of molten metals at low pressure and measure temperature gradients near the evaporating surface. Schematic diagrams and graphs. (N12, M23)

296-N. Perfect Demarcation of the Diamond Crystal Structure in Germanium. S. A. Robinson, P. L. Ostapkovich, E. S. Schlegel, and C. P. Gazzara. *Science,* v. 116, Oct. 3, 1952, p. 362-364.

Arrangement of equipment permits observations of the top surface of molten Ge. Thus one can watch the Ge nucleate into the single crystal solid. Visible nucleation commences from the top and is associated with definite geometric patterns, which may be triangular, hexagonal, or diamond in nature, depending upon the plane of growth. (N12, Ge)

P

PHYSICAL PROPERTIES AND TEST METHODS

530-P. Heat Conductivity of Superconductive Lead Below 1° K. J. L. Olsen and C. A. Renton. *Philosophical Magazine,* ser. 7, v. 43, Sept. 1952, p. 946-948.

Graphical data are presented. (P11, Pb)

531-P. Interpretation of the de Haas-van Alphen Effect. L. Onsager. *Philosophical Magazine,* ser. 7, v. 43, Sept. 1952, p. 1006-1008.

Deals with magnetic susceptibilities of metals. (P16)

532-P. Magnetic Viscosity Under Discontinuously and Continuously Variable Field Conditions. R. Street, J. C. Woolley, and P. B. Smith. *Proceedings of the Physical Society,* v. 65, sec. B, Sept. 1, 1952, p. 679-696.

Apparatus, specimens of Fe, discontinuous field changes, continuously variable demagnetizing fields, and relation between magnetic viscosity and irreversible susceptibility. Diagrams and graphs. (P16, Fe, SG-n, p)

533-P. Pile Neutron Absorption Cross Sections of Lead 206 and 207. K. L. Aitken, D. J. Littler, E. E. Lockett, and G. H. Palmer. *Proceedings of Physical Society,* v. 65, sec. A, Sept. 1, 1952, p. 761.

Mass spectrometer analyses and cross-section measurements of two samples of Pb. (P10, Pb)

534-P. The Deuteron Stripping Reaction With Aluminium. J. R. Holt and T. N. Marsham. *Proceedings of Physical Society,* v. 65, sec. A, Sept. 1, 1952, p. 763-764.

Reports results obtained with the reaction $^{27}Al(d, p)\ ^{28}Al$. Graphs. (P10, Al)

535-P. The Thermal Accommodation Coefficient of Gases and Their Adsorption on Iron. A. E. J. Eggleton and F. C. Tompkins. *Transactions of the Faraday Society,* v. 48, Aug. 1952, p. 738-749.

Part of a general study of kinetics and thermodynamics of sorption of gases by pure Fe in which thermal accommodation coefficients of several gases at an Fe wire have been measured. Graphs and tables. 24 ref. (P13, Fe)

536-P. (English.) **An Investigation of the Validity of the Wiedemann-Franz-Lorenz Law.** J. O. Linde. *Arkiv För Fysik,* v. 4, no. 6, 1952, p. 541-554.

A critical investigation of the thermal conductivity of normal metals (Cu, Au, and Al) and Ag alloys. A formula is presented for the relation between thermal and electrical resistivity which takes into account the different behavior of the two parts of thermal resistivity of an alloy as regards their temperature dependence. Results are analyzed by above law. Graphs. 10 ref. (P11, Cu, Au, Ag, Al)

537-P. (German.) **Theory on the Saturation Magnetism in Binary Ferromagnetic Alloys.** Hermann Statz. *Zeitschrift für Naturforschung,* v. 7a, Aug. 1952, p. 506-511.

Study of the electron structure of certain binary alloys and correlation with the saturation magnetization. Diagrams and graphs. (P16, SG-n, p)

538-P. Dimensional Changes Normal to the Direction of Diffusion. R. W. Balluffi and B. H. Alexander. *Journal of Applied Physics,* v. 23, Sept. 1952, p. 953-956.

Measurements of dimensional changes normal and parallel to direction of diffusion in small wires and thin foils of Au into which Ag was diffused from the vapor. Diagram, tables, graph, and photomicrographs. 12 ref. (P10, N1, Au, Ag)

539-P. The Temperature Dependence of the Viscosity of Liquids. F. Gutmann and L. M. Simmons. *Journal of Applied Physics,* v. 23, Sept. 1952, p. 977-978.

Equation derived and its adequacy examined for literature data on a variety of liquids, organic and inorganic, and the metals, Hg, Ga, K, and Na. 10 ref. (P10, Hg, Ga)

540-P. Field Emission From Tantalum in the Normal and Superconducting State. Robert Gomer and John K. Hulm. *Journal of Chemical Physics,* v. 20, Sept. 1952, p. 1500-1502.

Experimental procedure and results. Photograph of microscope assembly used. (P15, Ta)

541-P. The Free Energies of Formation of Tricalcium and Tetracalcium Phosphates. J. B. Bookey. *Journal of the Iron and Steel Institute,* v. 172, Sept. 1952, p. 61-66.

To increase knowledge of P-O equilibria the reduction equilibria of tricalcium and tetracalcium phosphates with hydrogen were studied in the range 1250-1550° C., and results used to calculate free-energy changes involved in reactions of solid CaO and gaseous oxygen and phosphorus and in that of the solution of gaseous phosphorus in liquid iron. Apparatus diagram and tables. 14 ref. (P12, Fe)

542-P. The Free Energy of Formation of Magnesium Phosphate. J. B. Bookey. *Journal of the Iron and Steel Institute,* v. 172, Sept. 1952, p. 66-68.

A study in relation to complex dephosphorizing slags. Reduction equilibrium of Mg orthosphosphate with H was studied in range 1000-1250° C., and results used to calculate above. 12 ref. (P12, B21)

543-P. Thermodynamic Properties of Silicon Monoxide; an Experimental Study of the Equilibria $SiO_2 + Si = 2SiO$ and $SiO_2 + H_2 = SiO + H_2O$. N. C. Tombs, A. J. E. Welch. *Journal of the Iron and Steel Institute,* v. 172, Sept. 1952, p. 69-78.

A study of the above in the range 1200-1650° C. Significance to steelmaking. Tables. 25 ref. (P12, B21)

544-P. Infrared Absorption in High Purity Germanium. H. B. Briggs. *Journal of the Optical Society of America,* v. 42, Sept. 1952, p. 686-687.

Results of measurements of extinction coefficients for high purity single-crystal Ge in region of fundamental absorption limit which may be used to predict performance near cut-off range of optical filters of various thicknesses. Typical transmission curves for range 2-25μ are included. Graphs. (P17, Ge)

545-P. Silver Films and Dielectric Multiple Films in Interferometry. D. A. Jackson and K. Kuhn. *Nature,* v. 170, Sept. 13, 1952, p. 455-456; disc., p. 456.

Brief critical report on work done by A. H. Jarrett and H. v. Klüber, followed by a short discussion by A. H. Jarrett in which he mentions some of his recent experimental results. (P17, T8, Ag)

546-P. Russell Effect on Evaporated Metal Films. L. Grunberg and K. H. R. Wright. *Nature,* v. 170, Sept. 13, 1952, p. 456-457.

Experimental data. Effect is that freshly abraded metal surfaces produce an image on photographic plates. (P17)

547-P. Effect of Minority Carriers on the Breakdown of Point Contact Rectifiers. Ernst Billig. *Physical Review*, ser. 2, v. 87, Sept. 15, 1952, p. 1060-1061.

On the application of short high-voltage pulses to point contact rectifiers in the inverse direction, thermal instability of Ge and Se is observed. Intrinsic conduction due to the thermal generation of electron-hole pairs and the subsequent passage of minority carriers is suggested as the cause of electrical breakdown. 10 ref. (P15, Ge, Se)

548-P. The Resistivity of Cu_3Au During Neutron Irradiation. H. L. Glick, F. C. Brooks, W. F. Witzig, and W. E. Johnson. *Physical Review*, ser. 2, v. 87, Sept. 15, 1952, p. 1074.

Samples of initially ordered and disordered Cu_3Au were irradiated in a nuclear reactor at 80° C. Continuous electrical resistivity measurements suggested that pile irradiation has both ordering and disordering tendencies. (P15, Cu, Au)

549-P. Mobility of Electrons in Germanium. P. P. Debye and E. M. Conwell. *Physical Review*, ser. 2, v. 87, Sept. 15, 1952, p. 1131-1132.

Measurements were made, at room temperature, on a number of Ge samples in various conductivity ranges which yielded higher mobilities than any previously found. In range of resistivity for which drift mobility values are available, new values substantially agree with drift mobility values measured by Haynes. (P15, Ge)

550-P. Superconductivity Below 1° K. M. C. Steele. *Physical Review*, ser. 2, v. 87, Sept. 15, 1952, p. 1137-1138.

Experiment for studying critical magnetic curves for Ru and Cd. Graphs. (P16, Ru, Cd)

551-P. Interpretation of the Low Temperature Hall Curve of a Degenerate Germanium Sample. D. M. Finlayson, V. A. Johnson, and F. M. Shipley. *Physical Review*, ser. 2, v. 87, Sept. 15, 1952, p. 1141-1142.

Graphs and table. (P15, Ge)

552-P. Theoretical and Experimental Heat Capacities of Superconducting Metals. R. W. Worley, W. M. Zemansky, and H. A. Boorse. *Physical Review*, ser. 2, v. 87, Sept. 15, 1952, p. 1142-1143.

Results of their experiments compared with those of previous investigations. Metals studied were V, Cb, Ta, La, In, and Sn. Graphs. 11 ref. (P15, V, Cb, Ta, La, In, Sn)

553-P. Nitrogen in Metals. David O. Caldwell. *Review of Scientific Instruments*, v. 23, Sept. 1952, p. 501-502.

Nitrogen activities in several metals were investigated using the UCLA 41-in. synchrocyclotron. Graph. (P12)

554-P. The Mechanism of Hydrogen Evolution at Copper Cathodes in Aqueous Solutions. J. O'M. Bockris and N. Pentland. *Transactions of the Faraday Society*, v. 48, Sept. 1952, p. 833-839.

Application to Cu cathodes on which no work in purified solutions is recorded. Tables and graphs. 23 ref. (P15, Cu)

555-P. Copperweld Fine Wire. F. E. Leib. *Wire and Wire Products*, v. 27, Sept. 1952, p. 878-880, 927.

Physical and mechanical properties and applications as a fine wire conductor.
(P general, Q general, T1, ST, Cu)

556-P. (English.) **The Influence of Elastic Shear Strains on the Conductivity and Thermo-Electric Force of Cubic Metals.** J. Smit. *Physica*, v. 18, Aug.-Sept., 1952, p. 587-596.

Influence which elastic shear strains have on shape of Fermi surface of metals and on electrical conductivity. Thermal e.m.f. was calculated for monovalent f.c.c. metals, and results were compared with experimental values for Cu, Ag, and Au. 12 ref. (P15, Q21, Cu, Ag, Au)

557-P. (English.) **On the Behaviour of an Electrically Conductive Liquid in a Magnetic Field.** Bo Lehnert. *Arkiv för Fysik*, v. 5, no. 1-2, 1952, p. 69-90.

Theoretical discussion, and experimental data for mercury.
(P15, P16, Hg)

558-P. (English.) **Experimental Researches on "Wetting Effect" and "Liquostriction".** Carl Benedicks and Robert Härden. *Arkiv för Fysik*, v. 3, nos. 4-5, 1952, p. 407-440.

Considers new experiments regarding wetting effect on various substances together with theoretical points of view regarding the concept of surface tension. Also gives experimental data on effect of liquostriction — the expansion effect caused by intimate contact of a liquid with a solid body. Includes sections relating to both metals and nonmetals. (P10)

559-P. (English.) **Determination of the Alpha-Energy of U^{235}.** R. Vestergaard and E. Haeffner. *Arkiv för Fysik*, v. 3, no. 6, 1952, p. 557-575.

Experimental details and data. Circuit diagrams and graphs. 21 ref. (P10, U)

560-P. The Viscosity of Molten Tin, Lead, Zinc, Aluminium, and Some of Their Alloys. T. P. Yao and V. Kondic. *Journal of the Institute of Metals*, v. 81, Sept. 1952, p. 17-24.

Previous work as well as experimental research by the author. The apparatus employed was such that both the rotating-crucible and oscillating-pendulum methods could be employed. Oscillograms, tables, and schematic diagram of the viscometer. 11 ref. (P10, Sn, Pb, Zn, Al)

561-P. Magnetic Susceptibilities of Palladium-Rhodium Alloys From 20°-300° K. F. E. Hoare, J. S. Kouvelites, and J. C. Matthews. *Nature*, v. 170, Sept. 27, 1952, p. 537-538.

Possibilities of increasing the number of holes in the *d*-band by alloying small amounts of an appropriate metal (rhodium or silver) with palladium. (P16, Pd)

562-P. A New Gyromagnetic Effect in Permalloy and Iron. S. J. Barnett and Louis A. Giambomi. *Physical Review*, ser. 2, v. 88, Oct. 1, 1952, p. 28-37.

Reviews previous work and theory involved. Describes experiments. Diagrams and graphs. 10 ref.
(P16, Ni, Fe)

563-P. Radiation Damage and Recovery in Cu, Ag, Au, Ni, and Ta. J. W. Marx, H. G. Cooper, and J. W. Henderson. *Physical Review*, ser. 2, v. 88, Oct. 1, 1952, p. 106-112.

Electrical resistivity changes induced by 12-Mev. deuteron bombardment of Cu, Ag, Au, Ni, and Ta foils were determined as functions of integrated flux. Bombardments were carried out at about −140 and −150° C., and differences in the two sets of measurements were traced to a thermal recovery process. It is suggested that migration of vacancy pairs offers a reasonable model for initial recovery process, although other mechanisms are also discussed. Diagrams, tables, and graphs. 16 ref.
(P13, Cu, Au, Ag, Ni, Ta)

564-P. A New Photographic Method of Measuring the Dispersion of the Optical Constants of Metals. J. Bor. *Proceedings of the Physical Society*, v. 65, sec. B, Oct. 1, 1952, p. 753-758.

Dispersion is determined on a photographic plate as a vertical band of variable intensity for each wavelength and is compared microphotometrically with an adjacent band of graded intensity produced by same wavelength. Diagrams. (P17)

565-P. The Absorption of Light By Noble Metals and Its Relation to the van der Waals Contribution to the Cohesive Energy. J. Friedel. *Proceedings of the Physical Society*, v. 65, sec. B, Oct. 1, 1952, p. 769-774.

Theoretical analysis. Diagrams and tables. 20 ref. (P17, EG-c)

566-P. The Optical Constants of Thin Metallic Films Deposited by Evaporation. P. L. Clegg. *Proceedings of the Physical Society*, v. 65, sec. B, Oct. 1, 1952, p. 774-781.

Optical properties of evaporated films of Ag, Au, Sn, and In were determined by a photo-electric method. Influence of factors concerned with evaporation procedure was investigated in case of Ag films. Application of Maxwell Garnett's theory shows qualitative agreement with experimental values. Graphs. 10 ref. (P17, L25, Ag, Au, Sn, In)

Q

MECHANICAL PROPERTIES AND TEST METHODS; DEFORMATION

958-Q. Strain Rosette Analysis. H. Fealdman. *Engineer*, v. 194, Sept. 12, 1952, p. 341-342.

Methods of analyzing results obtained from use of multi-element wire resistance strain gages in which separate elements are variously oriented at a point. The theory underlying the Mohr's circle representation of 2-dimensional stress and an analogous circle for strain is developed. Diagrams. (Q25)

959-Q. Strength, Structure, and Composition of Unalloyed Grey Iron. H. T. Angus. *Foundry Trade Journal*, v. 93, Aug. 28, 1952, p. 239-245; Sept. 4, 1952, p. 269-271; disc., p. 271-273.

Summary of the relationship existing between characteristic mechanical properties. Includes relationship between composition and microstructure, calculation of cooling rate and relation of cooling rate and strength. 10 ref.
(Q general, M27, CI)

960-Q. Bending of Elastoplastic Circular Plates With Large Deflection. P. M. Naghdi. *Journal of Applied Mechanics*, v. 19. *(Transactions of the American Society of Mechanical Engineers*, v. 74), Sept. 1952, p. 293-300.

A general theory for elastoplastic bending of thin circular plates with polar symmetrical loading, and a numerical integration method for complete solution of problems within scope of the general theory. Using a stress-strain curve for 24S-T aluminum which is determined experimentally, numerical solutions for bending moments, membrane forces, and deflections are obtained. Graphs and tables. 22 ref. (Q5, Al)

961-Q. Forced Lateral Vibration of Beam Carrying a Concentrated Mass. W. H. Hoppmann, 2nd. *Journal of Applied Mechanics*, v. 19 *(Transactions of the American Society of Mechanical Engineers*, v. 74), Sept. 1952, p. 301-307.

Study made of a simply supported beam with a concentrated mass attached at its mid-point. A sinusoidally time-varying force is assumed to act on the mass in a direction normal to the length of the beam. From this solution the solution for a sinusoidal pulse is derived easily. Experimental results are given for steel. Graphs and oscillograms.
(Q23, ST)

962-Q. Correlation of Creep Properties by a Diffusion Analogy. Leon Green, Jr. *Journal of Applied Mechanics*, v. 19 *(Transactions of the American Society of Mechanical Engineers*, v. 74), Sept. 1952, p. 320-326.

Equation for above and applications. Comparison with experimental

results. Creep data for Cu, Pb, Pt, Ag, Au, W, Sn, Co, and C. Graphs. 37 ref. (Q3)

963-Q. Plastic Flow in a V-Notched Bar Pulled in Tension. E. H. Lee. *Journal of Applied Mechanics*, v. 19. *(Transactions of the American Society of Mechanical Engineers*, v. 74), Sept. 1952, p. 331-336.

The distribution of stress and deformation are determined from the analysis of the motion with large strains as the initial notch width pulls down toward line contact as the test proceeds. Analysis is based on theory of flow of a so-called Saint Venant-Mises material, which flows at a constant yield limit given by Mises criterion, and obeys the Mises flow-type relationship between stress and strain increments. Experimental data on deformation of a square grid scribed on a bar. Diagrams and graphs. (Q27)

964-Q. Experiments on the Plastic Compression of a Block Between Rough Plates. J. F. Nye. *Journal of Applied Mechanics*, v. 19. *(Transactions of the American Society of Mechanical Engineers*, v. 74), Sept. 1952, p. 337-346.

Experiments designed to check theory of Hill, Lee, and Tupper. Theoretical predictions for average pressure on plates are verified by experiments, and details of strain distribution within block and positions of elastic-plastic boundaries are closely compared with theory. Material used was rolled Te-Pb containing 0.05% Te. Diagrams, graphs and photographs. (Q23, Pb)

965-Q. Thermal Stresses in Bodies Exhibiting Temperature-Dependent Elastic Properties. H. H. Hilton. *Journal of Applied Mechanics*, v. 19. *(Transactions of the American Society of Mechanical Engineers*, v. 74), Sept. 1952, p. 350-354.

An analysis of thermal stresses and strains, taking into account variations of elastic shear modulus and coefficient of thermal expansion with temperature. (Q21, P11)

966-Q. Minimum Weight of Tapered Round Thin-Walled Columns. Morris Feigen. *Journal of Applied Mechanics*, v. 19. *(Transactions of the American Society of Mechanical Engineers*, v. 74), Sept. 1952, p. 375-380.

Optimum wall thickness of a cylindrical round tube column is a function of load only and is independent of diameter. Optimum wall thickness of a tapered column is found to be constant along its length. Application to 755-T Al. Graphs. (Q23, Al)

967-Q. On the Direction of Fatigue Cracks in Polycrystalline Ingot Iron. R. E. Peterson. *Journal of Applied Mechanics*, v. 19. *(Transactions of the American Society of Mechanical Engineers*, v. 74), Sept. 1952, p. 408-409.

Discussion of paper by F. A. McClintock, with author participation. (Item 628-Q, 1952). (Q7, Fe)

968-Q. Note on Ultimate Strength of Webs in Shear. R. Tatham. *Journal of the Royal Aeronautical Society*, v. 56, Sept. 1952, p. 701-703.

Experimental evidence available in N.A.C.A. Technical Notes suggests that curves of R.Ae.S Data Sheet 02.02.13 giving allowable shear stress for failure may be too high for some aluminum alloys. Pending further experimental work recommendations are made as a basis for design data. Graphs. (Q2, Al)

969-Q. Precise Measurement of Fatigue Test Load. M. H. Roberts. *Metallurgia*, v. 46, Aug. 1952, p. 107-114.

Lack of precision of optical lever method of measuring alternating tension and compression in push-pull fatigue tests led to development of an electrical resistance strain gage method, using a cathode ray oscillograph, with which results reproducible to ±1% can be obtained. Details of method. Circuit and other diagrams, oscillograms, and tables. (Q7)

970-Q. Experimental and Theoretical Determination of Thermal Stresses in a Flat Plate. Richard R. Heldenfels and William M. Roberts. *National Advisory Committee for Aeronautics*, Technical Note 2769, August 1952, 35 pages.

Characteristics of commercially available bonded resistance wire strain gages to determine their suitability for measuring stresses under simple conditions of stress and temperature. 75S-T6 Al alloy was used. (Q25, Al)

971-Q. Theoretical Distribution of Slip Angles in an Aggregate of Face-Centered Cubic Crystals. John M. Hedgepeth. *National Advisory Committee for Aeronautics*, Technical Note 2777, August 1952, 32 pages.

Analysis of the relative frequency of occurrence of any given slip-line angle in a plastically deformed polycrystal composed of face-centered cubic crystals for the case of simple tension. Comparison is made with another theory and with experimental results for 25-0 Al alloy. Diagrams. (Q24, Al)

972-Q. Friction: Main Cause of Engine Wear. *Petroleum Processing*, v. 7, Sept. 1952, p. 1263-1266. (Based on "How Engines Wear", by J. F. Kunc, Jr., D. S. McArthur, and L. E. Moody).

Reports a study in which friction along with some mild abrasion is the principal cause of engine wear. (Q9)

973-Q. The Transfer of Metal to Plastics During Sliding. E. Rabinowicz and K. V. Shooter. *Proceedings of the Physical Society*, v. 65, sec. B, Sept. 1, 1952, p. 671-673.

Report of investigations on amount of metal transferred when a radioactive metal (steel, Cd, Ag, Zn, or Cu) is slid over surface of a plastic. (Q9, ST, Cd, Ag, Zn, Cu)

974-Q. Research Subdivision of ISTC Division XXIX Presents Data on SAE Grade 8 Bolts of Boron Steel. A. S. Jameson. *SAE Journal*, v. 60, Sept. 1952, p. 80-81.

Graphical data on mechanical properties of bolts made from 50B40 and 50B44 boron steels. Latter meet tensile strength requirements for SAE Grade 8 bolts. (Q general, T7, AY)

975-Q. (German.) **Conditions of Structure and Crystallization After Cold Deformation and Alternating Stressing.** Max Hempel, Hans-Rolf Sander, and H. M. Möller. *Stahl und Eisen*, v. 72, Aug. 28, 1952, p. 1076-1086, disc., p. 1086-1087.

Methods and problems to be solved by alternating stress tests; examination of structure and residues and X-ray examinations on mild steel in order to follow phenomena occurring within crystallites after cold deformation followed by alternating stresses; nature of precipitates within the crystallites; dependence of their appearance on magnitude and duration of alternating stress, effect of temperature; and correlation between appearance of precipitates and distinctness of interference rings on X-ray films. Work was done on mild steels. Tables, graphs, micrographs, and diffraction patterns. 14 ref. (Q25, Q24, N5)

976-Q. (Japanese.) **Internal Friction of Iron and Nickel. II. Internal Friction and Plastic Deformation of Pure Ferromagnetic Metals.** Makoto Osawa. *Nippon Kinzoku Gakkai-Si* (Journal of the Japan Institute of Metals), v. 16, Jan. 1952, p. 15-18.

Metals were subjected to plastic deformation of various degrees. Internal friction was measured by means of resonance of longitudinal oscillation. (Q22, Fe, Ni, SG-n, p)

977-Q. (Japanese.) **Theory of Breaking Strength. I. Static Strength.** Hideji Suzuki. *Nippon Kinzoku Gakkai-Si* (Journal of the Japan Institute of Metals), v. 16, Jan. 1952, p. 19-23.

A formula relating breaking strength of a crystal to its thermodynamic properties was developed and successfully applied to tensile testing of specimens under internal stress or hydrostatic pressure. Graph and diagrams. (Q27)

978-Q. (Japanese.) **Studies on the Solid Retainer Materials for Ball Bearings. I. Wearing Properties of Various Metals and Alloys Against Quenched Chromium Bearing Steels.** Toranosuke Kawaguchi. *Nippon Kinzoku Gakkai-Si* (Journal of the Japan Institute of Metals), v. 16, Jan. 1952, p. 30-34.

Thirteen Cu-base, eight Al-base, and five ferrous alloys were evaluated for their wear and tensile properties. Order of merit is given. Tables and graphs. (Q9, Cu, Al, Fe)

979-Q. (Japanese.) **Mechanism of Shearing of Metal as Indicated by Microstructure and Hardness Distribution.** Waichi Ota. *Nippon Kinzoku Gakkai-Si* (Journal of the Japan Institute of Metals), v. 16, Jan. 1952, p. 51-56.

Results of investigation for Armco iron and steel are tabulated and illustrated by photomicrographs. (Q2, M7, Q29, Fe, ST)

980-Q. Testing Machine Setups Duplicate Operating Conditions. *Automotive Industries*, v. 107, Oct. 1, 1952, p. 50-52, 142, 145.

Several simulated service-test fixtures which have been designed for use on fatigue testing machines. Diagram shows cross section of a simulated service fatigue test of a rubber motor mount. (Q7)

981-Q. Aerodynamic Heating in High Speed Flight. M. A. Sulkin. *Aviation Age*, v. 18, Sept. 1952, p. 28-29.

Problems arising from the so-called "thermal barrier", successor to the well-known "sonic barrier" which plagued aircraft designers in the 1930's. Includes some data on variations with temperature of strength and strength-weight ratio for Al, Ti, and steel. (Q23, T24, Al, Ti, ST)

982-Q. Some Mechanical and Adhesive Properties of Indium. A. C. Moore. *British Journal of Applied Physics*, v. 3, Sept. 1952, p. 299-301.

Experiments show that (in absence of surface contamination) adhesion between indium and metal surfaces depends only on area of contact and on time of breaking. Detailed behavior may be correlated with creep properties of indium. Experimental results also given for a number of nonmetals. Relationship to friction. 10 ref. (Q9, Q3, In)

983-Q. Photoelastic Investigation of Transversely Loaded Plates by the Double-Layer Method. A. Kuske. *Engineers Digest*, v. 13, Sept. 1952, p. 307-308. (Translated and condensed from *Zeitschrift des Vereines Deutscher Ingenieure)*

Previously abstracted from original. See item 927-Q, 1952. (Q25)

984-Q. Metal Transfer and Wear. I. Ming Feng. *Journal of Applied Physics*, v. 23, Sept. 1952, p. 1011-1019.

A newly developed theory of metal transfer and wear and the experimental support. Material used was 70-30 brass in the annealed condition. Optical micrographs. 11 ref. (Q9, Cu)

985-Q. The Separation of Stacking Fault Broadening in Cold-Worked Metals. B. E. Warren and B. L. Averbach. *Journal of Applied Physics*, v. 23, Sept. 1952, p. 1059.

Technique for separating above broadening effect occurring in X-ray reflections due to slip on planes in

face-centered cubic metals. Data for a 2% Si copper alloy. Graphs. (Q24, Cu)

986-Q. Effect of Specimen Length on the Strength of a Material With Random Flaws. K. E. Puttick and M. W. Thring. *Journal of the Iron and Steel Institute*, v. 172, Sept. 1952, p. 56-61.

Problem is considered as essentially that of predicting the mean and standard deviation of strengths of chains from a knowledge of characteristics of individual links. Theoretical discussion. Experimental data on cold-drawn phosphor-bronze wire. Appendix deals with cases where weakest-link theory is not appropriate. Graphs. (Q23, Cu)

987-Q. Properties of Cast Steels Improved With Rare Earth Element Additions. G. A. Lilliequist and C. G. Mickelson. *Journal of Metals*, v. 4, Oct. 1952, p. 1024-1031.

Survey shows that addition of Ce, La, Pr, Nd, and Sm to cast steels improves ductility, impact strength, inclusions, hot tears, fluidity, sulfur reduction, porosity, weldability, and feedability. Tables, graphs, diagrams, and photographs. (Q general, E25, CI, EG-g)

988-Q. Kinking in Zinc Single-Crystal Tension Specimens. Jack Washburn and Earl R. Parker. *Journal of Metals*, v. 4, Oct. 1952, *Transactions of American Society of Mechanical Engineers*, v. 194, 1952, p. 1076-1078.

Kinking was observed under conditions of low stress and high temperature. Relationship to other plastic bending phenomena on basis of dislocation theory. Experiments on stress-induced motion of small-angle boundaries. Diagrams and micrographs. 13 ref. (Q27, Zn)

989-Q. Formation of Nitrides From Atmospheric Exposure During Creep Rupture of 18 Pct Cr-8 Pct Ni Steel. E. J. Dulis and G. V. Smith. *Journal of Metals*, v. 4, Oct. 1952; *Transactions of American Society of Mechanical Engineers*, v. 194, 1952, p. 1083-1084. Micrographs. (Q4, SS)

990-Q. Dynamic Formation of Slip Bands in Aluminum. N. K. Chen and R. B. Pond. *Journal of Metals*, v. 4, Oct. 1952; *Transactions of American Society of Mechanical Engineers*, v. 194, 1952, p. 1085-1092.

Experimental apparatus by which progressive formation of slip bands can be recorded while specimen is undergoing deformation. Qualitative and quantitative data on dynamic formation of slip bands is presented with special interest concerning propagation of slip bands, spacing of slip bands, and their relations to strain hardening. Views on formation of slip bands. A mechanism of the unit process involved in formation of a slip band is proposed. Micrographs and graphs. 10 ref. (Q24, Al)

991-Q. Mechanical Properties of Intermetallic Compounds at Elevated Temperatures. Robert Lowrie. *Journal of Metals*, v. 4, Oct. 1952; *Transactions of American Society of Mechanical Engineers*, v. 194, 1952, p. 1093-1100.

Most of the intermetallic compounds investigated exhibited extensive plastic deformation at elevated temperatures. Correlations of tensile strength and elongation were attempted with melting temperature, valence electron configurations of component elements, heat of formation, crystal structure, density, and volume decrease accompanying compound formation. Those investigated were Al_7Cr, Al_4Cr, Cr Sb, $Cu_{17}Al_9$, Cu_5Ca, Cu_2Mg, Cu_3P, Cu_3Si, Ni_3Si, Ni_3Si + Ni_5Si_2, Ni_2Si_2, and Ni_2Si. Diagrams, graphs, tables, and micrographs. 30 ref. (Q23)

992-Q. Mass Production. B. Starck. *Metal Industry*, v. 81, Sept. 5, 1952, p. 187-190.

See abstract of "Some Factors Determining the Choice of Materials and Methods for Mass Production of Non-Ferrous Details", 4th International Mechanical Engineering Congress, June 1952. See item 943-Q, 1952. (Q23, Al, Mg, Cu, Zn)

993-Q. Designing Magnesium Castings and Forgings. George L. Moore. *Modern Metals*, v. 8, Sept. 1952, p. 62-64, 66.

See abstract under similar title, Engineer Research and Development Laboratories (Ft. Belvoir, Va.), "The Magnesium Symposium"; item 891-Q, 1952. (Q general, E general, F22, Mg)

994-Q. Theory of Slip-Band Formation. John C. Fisher, Edward W. Hart, and Robert H. Pry. *Physical Review*, ser. 2, v. 87, Sept. 15, 1952, p. 958-961.

The fine structure of slip bands on surfaces of plastically deformed crystals is explained in terms of model of dislocation-loop generation proposed by Frank and Read. Backstress produced by an expanding avalanche of about 300 dislocation loops is shown to be sufficient to stop dynamic loop generation at the source. (Q24)

995-Q. (French.) **Tensile Testing of Drill Pipes.** F. Peyssart. *Third World Petroleum Congress, Proceedings*, Sec. II, 1951, p. 25-29.

Use of specially designed hydraulic apparatus. (Q27)

996-Q. Strain Patterns in Charpy Impact Specimens of 0.20 Pct C Mild Steel. E. S. Bumps. *Journal of Metals*, v. 4, Oct. 1952; *Transactions of American Society of Mechanical Engineers*, v. 194, 1952, p. 1067-1070.

Strain patterns illustrating various stress conditions in partially deformed Charpy specimens are presented along with a discussion of possible dependence of transition energy on the yield phenomenon. Macrographs. (Q6, CN)

997-Q. Effect of Strain-Temperature History on the Low-Temperature Properties of Ingot Iron. *Welding Journal*, v. 31, Sept. 1952, p. 439s-440s.

Previously abstracted from an article by G. W. Geil and N. L. Carwile, *Journal of Research of the National Bureau of Standards*. See item 758-Q, 1952. (Q27, Fe)

998-Q. The Initiation and Propagation of Fatigue Cracks in Mild Steel Pieces of Square Section. H. L. Cox and J. E. Field. *Aeronautical Quarterly*, v. 4, Aug. 1952, p. 1-18.

An investigation to determine positions and directions of propagation of fatigue cracks, and to examine correlation between these positions and directions and the planes on which maximum tensile and maximum shear stresses are generated. Diagrams, graphs, and photographs. (Q7, CN)

999-Q. Hydrogen Embrittlement Tests on Various Steels. F. A. Prange. *Corrosion*, v. 8, Oct. 1952, p. 355-357; disc., p. 357-360.

Cathodic embrittlement tests were made on a number of alloys having good properties for use in deep corrosive wells. Maximum hardness for use in embrittling environments should be Rockwell C-20. Micrographs and tables. (Q23, SS, AY, CN)

1000-Q. Relative Grain Translations in the Plastic Flow of Aluminium. W. A. Rachinger. *Journal of the Institute of Metals*, v. 81, Sept. 1952, p. 33-41.

Geometry of plastic deformation in the interior of a polycrystalline aggregate investigated by means of a grain-counting technique. Behavior of surface regions of a polycrystal subjected to high-temperature creep conditions has been studied also. Photomicrographs. 15 ref. (Q24, M27, Al)

1001-Q. The Young's Modulus, Poisson's Ratio, and Rigidity Modulus of Some Aluminium Alloys. N. Dudzinski. *Journal of the Institute of Metals*, v. 81, Sept. 1952, p. 49-55.

Elastic properties of various binary and ternary Al-base alloys. With exception of Ca, Sr, and Mg, all alloying elements investigated were found to enhance value of Young's modulus of binary alloys, Cr having greatest effect. Experimental data and results. Structure. Tables and photomicrographs. 10 ref. (Q21, Al)

1002-Q. The Institute of Petroleum Gear Lubrication Symposium. Part I. The Lubrication of Gears. *Journal of the Institute of Petroleum*, v. 38, Aug. 1952, p. 606-668; disc., p. 668-698.

Following papers presented: "Hydrodynamic Theory in Gear Lubrication", A. Cameron; "Gear-Tooth Wear", G. I. Finch and R. T. Spurr; "Criteria Governing Scuffing Failure", F. T. Barwell and A. A. Milne; "Some Factors Affecting Gear Scuffing", H. D. Mansion; "Note on Performance of Graphited Oil", E. A. Smith; and "The Wear and Pitting of Bronze Disks Operated Under Simulated Worm-Gear Conditions", L. S. Evans and R. Tourret. Tables, diagrams, photomicrographs, photographs, and references. (Q9)

1003-Q. Properties of Commonly Used Spring Materials. *Materials & Methods*, v. 36, Sept. 1952, p. 141, 143.

Data sheet dealing with mechanical properties and applications of a wide variety of spring materials, both ferrous and nonferrous. (Q general, T7, SG-b)

1004-Q. Correlation of Tensile Strength, Tensile Ductility, and Notch Tensile Strength With the Strength of Rotating Disks of Several Designs in the Range of Low and Intermediate Ductility. Arthur G. Holms and Andrew J. Repko. *National Advisory Committee for Aeronautics*, Technical Note 2791, Sept. 1952, 30 pages.

Burst tests were conducted on several designs of sound disks and disks with defects. Results were compared with tensile strength, tensile ductility, and notch tensile strength. Purposes were to determine extent to which disk strength can be increased by increasing tensile strength, the extent to which a correlation exists between disk strength and several mechanical properties of materials at low ductilities, and the influence of several types of stress concentration on strengths of disks made from ductile and brittle materials. Materials investigated were SAE 4150 steel, a toolsteel, a die steel, Inconel "X", and 18-8 stainless. (Q27, AY, TS, SS, Ni)

1005-Q. The Indication of Directional Properties by Hardness Testing. P. Grodzinski. *Sheet Metal Industries*, v. 29, Oct. 1952, p. 908-914.

Historical survey, modern investigations, and directional hardness of rolled Cu and a single Cu crystal. Tables, graphs and micrographs. 15 ref. (Q29, Q24, Cu)

1006-Q. (Book.) **Strength of Materials. Ed. 2.** John W. Breneman. 140 pages. 1952. McGraw-Hill Book Co., 330 W. 42nd St., New York 18, N. Y.

An elementary text, not requiring mathematics beyond trigonometry. For this edition parts of the material have been rewritten and expanded. Problems have been improved. Coverage includes riveted and welded connections and problems and discussion on various metals. (Q23)

R

CORROSION

484-R. Grease Feedability Reduces Fretting Corrosion. *Aviation Age,* v. 18, Sept. 1952, p. 6-16.

A study of effect of soap base, consistency, and additives on minimizing fretting corrosion. Li, Na, Na-Ca, and Ca soaps were used on ball thrust bearings in a special friction oxidation tester. Includes literature survey. Tables and photographs. 20 ref. (R1)

485-R. Corrosion Inhibitor Checklist. Maxey Brooke. *Chemical Engineering,* v. 59, Sept. 1952, p. 286-287.

Representative liquids and the following metals: Al, Cu, brass, Mg, steel, Monel, and Sn plate. 41 ref. (R10, Al, Cu, Mg, ST, SS, Ni)

486-R. More About Applications of New Chrome Carbides. *Chemical Engineering,* v. 59, Sept. 1952, p. 288, 290, 292.

Briefly compares above with tungsten carbide and steels with emphasis on corrosion resistance. (R general, T general, Cr, C-n, W, ST)

487-R. Corrosion. Mars G. Fontana. *Industrial and Engineering Chemistry,* v. 44, Sept. 1952, p. 101A-102A, 104A.

Methods and techniques for determining the erosion-corrosion resistance of metals and alloys. (R1)

488-R. Metallic Corrosion Influenced by Ultrasonic Waves. Shigeto Yamaguchi. *Journal of Applied Physics,* v. 23, Sept. 1952, p. 1057-1058.

Ultrasonic waves were employed to stir the corroding solution in which immersion tests were carried out. From results obtained, the wet corrosion of metals was more reasonably elucidated by colloid science than by oxide film theory. Mg was the test metal. (R11, Mg)

489-R. High Temperature Oxidation of Some Iron-Chromium Alloys. D. Caplan and M. Cohen. *Journal of Metals,* v. 4, Oct. 1952; *Transactions of American Society of Mechanical Engineers,* v. 194, 1952, p. 1057-1065.

The scaling characteristics of three Fe-Cr alloys were investigated by determining their weight gain vs. time curves at 1600-2000° F. Scales formed were examined using techniques of X-ray diffraction and spectrographic and metallographic analysis in an attempt to explain discontinuities in curves and to elucidate mechanism of scaling. Graphs, tables, and micrographs. 33 ref. (R2, Fe, Cr)

490-R. The Behaviour of Stranded Aluminium Conductors in Marine Atmospheres. F. A. Champion and E. W. Skerrey. *Light Metals,* v. 15, Sept. 1952, p. 286-290.

Investigation in reference to their resistance to corrosion. Tests of Al, Cu, and Zn coatings on steel cores were conducted. Tables and diagrams. (R3, Al, Cu, Zn, ST)

491-R. Some Problems of Corrosion in the Steel Industry. Herbert L. Coe. *Steel Equipment & Maintenance News,* v. 5, Sept. 1952, p. 9-12.

Types of corrosion, its control, and special problems in steel structures, roofing and siding, tanks, pipe lines, fittings. Mention of corrosion in masonry structures. (R general, ST, CN)

492-R. Material Problems in Chemical Process Equipment. L. Piatti. *Sulzer Technical Review,* no. 1, 1952, p. 21-34.

See abstract of article of similar title from *Schweizer archiv für angewandte Wissenschaft und Technik,* item 209-R, 1951. (R1, R2, T29, ST)

493-R. Utilization of Low-Grade Coals for Power Generation. Richard C. Corey and James W. Myers. *Combustion,* v. 24, Sept. 1952, p. 43-48.

Effects on over-all boiler performance of ash content, ash fusibility, coal-swelling properties, sulfur content, moisture, and grindability. Brief mention of corrosion and erosion. (R7)

494-R. Stress Corrosion Cracking of Steel Under Sulfide Conditions. C. N. Bowers, W. J. McGuire, and A. E. Wiehe. *Corrosion,* v. 8, Oct. 1952, p. 333-340; disc., p. 357-360.

Laboratory and field study. Data on stainless, carbon, and alloy steels, Monel and Inconel. Metallographic results. Recommendations on necessary mechanical properties. Theory. Diagram, tables, and photomicrographs. (R1, SS, CN, AY, Ni)

495-R. Cracking of High Strength Steels in Hydrogen Sulfide Solutions. J. P. Fraser and R. S. Treseder. *Corrosion,* v. 8, Oct. 1952, p. 342-350; disc., p. 357-360.

Laboratory data relating to spontaneous cracking and embrittlement of steel alloys under environmental and stress conditions pertinent to sour gas condensate wells. Composition and heat treatment of alloy, type and magnitude of stress, composition of corrosive solution, composition and pressure of gas environment, temperature, and time of exposure. Besides steel, data are given for Monels and Stellites. Proposed explanation involves stress-corrosion cracking and hydrogen embrittlement. Tables, micrographs, and photographs. (R1, Q23, SS, AY, CN, Ni, Co)

496-R. Field Experience With Cracking of High Strength Steels in Sour Gas and Oil Wells. *Corrosion,* v. 8, Oct. 1952, p. 351-354; disc., p. 357-360.

Report on accumulated field experience with corrosion cracking of oil well tubular goods and wellhead fittings in sour gas and oil wells. Descriptions of failed tubing, casing, and wellhead fittings. Data obtained from stressed specimens of various alloys placed in flowlines of wells in several fields. Possible remedial measures. Corrosion type is not known. (R1, SS, AY, CN)

497-R. Corrosion Control by Magic—It's Wonderful. H. H. Uhlig. *Corrosion,* v. 8, Oct. 1952, p. 361-363.

Examples of fraudulent practices of corrosion prevention; ways to evaluate new ideas in order to weed out superstition, witchcraft, dishonesty, and reactionary ideas. (R10)

498-R. Reaction Between Ferrous Iron and Dissolved Oxygen in Brine. D. C. Bond and G. G. Bernard. *Industrial and Engineering Chemistry,* v. 44, Oct. 1952, p. 2435-2438.

Apparatus and procedure. Data of importance in oil field technology, corrosion, etc. Graphs. 23 ref. (R7)

499-R. Oxidation Products Which Contribute to the Oxidation Resistance of TiC-Base Cermets. Harold M. Greenhouse. *Journal of the American Ceramic Society,* v. 35, Oct. 1, 1952, p. 271-274.

How to minimize oxidation of TiC cermets by curtailing two types of diffusion processes. This may be done by formtion of an amorphous glassy oxide and formation of oxidation products which enable certain types of crystalline oxides to occur in a definite order. Both these methods are discussed by means of representative examples. (R2, Ti, C-n)

500-R. Theoretical Analysis of the Diffusion Processes Determining the Oxidation Rate of Alloys. Carl Wagner. *Journal of the Electrochemical Society,* v. 99, Oct. 1952, p. 369-380.

Oxidation rate of alloys containing a noble metal (Au or Pt) and an oxidizable metal (Ni, Cu, or Zn) is calculated as a function of alloy composition. Graphs and tables. 47 ref. (R2, N1, Ni, Cu, Zn, Au, Pt, EG-c)

501-R. Corrosion of Aluminum by Carbon Tetrachloride. Milton Stern and Herbert H. Uhlig. *Journal of the Electrochemical Society,* v. 99, Oct. 1952, p. 381-388.

Quantitative effects of moisture, dissolved gases, and impurities in CCl_4, and effects of impurities and alloying constituents in Al. Serves as a basis for better understanding of the mechanism of reaction of Al with chlorinated organic solvents. Diagrams, graphs, and tables. 14 ref. (R7, Al)

502-R. Effect of Oxide Films on the Reaction of Aluminum With Carbon Tetrachloride. Milton Stern and Herbert H. Uhlig. *Journal of the Electrochemical Society,* v. 99, Oct. 1952, p. 389-392.

Describes experiments. Tables, graphs, and photographs. (R7, Al)

503-R. Electron Diffraction Studies on the Oxidation of Pure Copper and Pure Zinc Between 200° and 500° C. E. A. Gulbransen and W. R. McMillan. *Journal of the Electrochemical Society,* v. 99, Oct. 1952, p. 393-401.

A study of crystal structures of oxide films on pure Cu and pure Zn, a proposed intermediate oxide, a proposed pseudomorphic oxide of Zn, and of mechanism of low-temperature oxidation of Cu. Tables. 37 ref. (R2, M22, Cu, Zn)

504-R. A Preliminary Study of the Oxidation and Vapor Pressure of Chromium. E. A. Gulbransen and K. F. Andrew. *Journal of the Electrochemical Society,* v. 99, Oct. 1952, p. 402-406.

A report of reactions of Cr with O_2 at 7.6 cm. Hg and 700-900° C., as well as high-temperature reactions of Cr in high vacua. Graphs and tables. 22 ref. (R2, P12, Cr)

505-R. Measurement of the Corrosion Rate of a Metal From Its Polarizing Characteristics. W. J. Schwerdtfeger and O. N. McDorman. *Journal of the Electrochemical Society,* v. 99, Oct. 1952, p. 407-413.

Theoretical electrical relations between polarizing characteristics of elements of a galvanic couple and polarizing characteristics of the couple itself. Experimental demonstration by means of steel surfaces. Tables and graphs. 15 ref. (R11, ST)

506-R. A Polarographic Study of the Influence of Temperature on the Rate of Oxygen Consumption by Iron, Lead, and Zinc. Paul Delahay, Clarence F. Pillon, Jr., and Douglas Perry. *Journal of the Electrochemical Society,* v. 99, Oct. 1952, p. 414-416.

Determined in an acetate buffer of pH 5.0 at various temperatures. Experimental data were analyzed by assuming that over-all rate of oxygen reduction is controlled by rate of chemical reaction and by diffusion of oxygen toward the metal surface. Graphs. 11 ref. (R11, Fe, Pb, Zn)

507-R. Passivity of Titanium in Hydrochloric Acid Solutions. David Schlain and Joseph S. Smarko. *Journal of the Electrochemical Society,* v. 99, Oct. 1952, p. 417-422.

Study of the effect of air and various metal ions on electrode potentials and corrosion rates of Ti in various concentrations of HCl at room temperature. Graphs and tables. 14 ref. (R10, Ti)

508-R. Inorganic Corrosion Inhibitors in Acid Solution. Cecil V. King, Emil Goldschmidt, and Natalie Mayer. *Journal of the Electrochemical Society,* v. 99, Oct. 1952, p. 423-426.

In dilute HCl with excess KNO_3 as a depolarizer, Fe, Zn, and Cd dissolve at, or nearly at, a maximum rate controlled by rate of convection and speed of diffusion of hydrogen ions. Tables. 14 ref. (R10, Fe, Zn, Cd)

509-R. High-Temperature Corrosion Rates of Several Metals With Hydrogen Sulfide and Sulfur Dioxide. Milton Farber and Donald M. Ehrenberg. *Journal of the Electrochemical Society,* v. 99, Oct. 1952, p. 427-434.

Corrosion rates at temperatures above 1000° K. were determined for several metals including Cu, Ag, Inconel, Ni, 18-8 stainless steel, Fe, W, and Ta in atmospheres of H_2S, SO_2, and CO_2. Diagrams, graphs, and micrographs. 22 ref.
(R9, Cu, Ag, Ni, Fe, W, Mo, Ta)

510-R. A Practical Evalution of Metallic Coatings as Affecting Sensitivity to Stress-Corrosion Failure. C. H. Hannon. *Metal Finishing,* v. 50, Oct. 1952, p. 65-66, 71.

Results of tests in which Cu eyebolts with metallic coatings of Cu+Ni+Cr, Cu+Ni+Sn, Cu+Ag, Cu+Sn, Ni−Sn, and single electroplates of Ag, Cd, and Sn were tested to evaluate stress-corrosion.
(R11, R1, Cu, Ni, Cr, Sn, Ag, Cd)

511-R. Incipient Corrosion of Steel: Study of Its Initiation and Progress. F. Hargreaves. *Metal Treatment and Drop Forging,* v. 1, Sept. 1952, p. 385-390.

Study in which filiform corrosion was induced in a polished steel specimen and its growth traced. Effect of nonmetallic inclusions and droplets of various liquids, and influence of surface protectives. Micrographs.
(R1, R11, ST)

512-R. Corrosion Factors in Design and Lubrication. *Product Engineering,* v. 23, Oct. 1952, p. 142-147.

Design and lubrication are the two major fields into which many of the variables fall that are conducive to corrosion. Diagrams, tables, and photographs give specific information for many metals, alloys, and lubricants. (R7)

513-R. Corrosion Studies and the Use of Stainless Steel at the Back River Sewage Treatment Works, Baltimore, Md. C. E. Keefer and Kenneth M. Huston. *Sewage and Industrial Wastes,* v. 24, Oct. 1952, p. 1209-1220.

Corrosion tests on stainless steel, Al, Ni, alloys, Cu, cast and wrought irons, and mild steel. Plant-scale experience with stainless steel in primary settling tanks, in ferrous sulfate chlorinating tanks, in downspouts and gutters, in centrifugal sludge pump, and in vacuum filters. Effect of mechanical properties, and applications for stainless steel. Photographs and tables.
(R4, T4, SS, Al, Ni, Cu, CN, Cl)

S

INSPECTION AND CONTROL

477-S. Ultrasonic Survey of Riveted Drums. W. W. Campbell and R. H. Murfitt. *Journal of the Institute of Fuel,* v. 25, Sept. 1952, p. 190-195, disc., p. 196-197.

Use for detecting cracks between rivet holes of shell plates of riveted drums, where presence of butt straps preclude use of other methods. Radiation is introduced into seam from accessible internal or external surface of plate and is reflected from cracks. Location and extent of cracks can be observed. Diagrams and photographs. (S13)

478-S. The Study of Surfaces by Multiple-Beam Interferometry. O. S. Heavens. *Laboratory Practice,* v. 1, Sept. 1952, p. 249-252.

Method of studying surface topography by multiple-beam Fizeau fringes is outlined. Interpretation of a typical contour pattern from a mica crystal. Method has great power for distinguishing fine detail of a surface. Diagrams. (S15)

479-S. Various Gages for Inspecting Diameter of Under-Cut Bores. Robert Mery. *Machinery* (American), v. 59, Sept. 1952, p. 176-179.

Some gages designed by the author. (S14)

480-S. The Metallurgist's Role in the Interpretation of Non-Destructive Testing. S. L. Henry. *Non-Destructive Testing,* v. 11, July 1952, p. 16-20.

Procedures for evaluation of nondestructive testing. Five specific cases with method and results of examination. Methods included magnetic particle inspection, radiographic, and ultrasonic. Micrographs. (S13)

481-S. Units Used in Industrial Radiography to Describe Strength of Cobalt-60 Sources. J. Kastner. *Non-Destructive Testing,* v. 11, July 1952, p. 21-23.

Purpose was to examine above units and to point out factors which must be taken into account before source strengths expressed in different ways may be compared.
(S13, Co)

482-S. A Preliminary Report on the Picker-Polaroid Process in Industrial Radiography. J. A. Reynolds. *Non-Destructive Testing,* v. 11, July 1952, p. 24-27.

Actual and potential applications of the above process for medicinal and industrial X-ray equipment. Useful in nondestructive investigation. (S13)

483-S. Photoelectric Scanning of Fluorescent Indications. S. A. Wenk, K. D. Cooley, and R. M. Kimmel. *Non-Destructive Testing,* v. 11, July 1952, p. 28-31.

Development of a means for automatic scanning of indications such as are produced by the magnetic particle and penetrant methods. (S13)

484-S. (German.) **Analytical Chemistry as a Metallurgical Tool.** Walter Koch. *Stahl und Eisen,* v. 72, Aug. 28, 1952, p. 1056-1063.

Research tasks; trace elements in iron, their chemical combination and analytical determination; the deoxidation reaction; and deoxidation and combination of nitrogen. 10 ref. (S11)

485-S. Photometric Determination of Zirconium in Magnesium Alloys. Glenn B. Wengert. *Analytical Chemistry,* v. 24, Sept. 1952, p. 1449-1451.

Photometric alizarin red S method which gives accuracy equal to or better than the gravimetric procedures. Graphs and tables.
(S11, Mg, Zr)

486-S. Colorimetric Determination of Silver With p-Dimethylaminobenzalrhodanine. G. C. B. Cave and David N. Hume. *Analytical Chemistry,* v. 24, Sept. 1952, p. 1503-1505.

Effect of variables, procedure, and experimental data. (S11, Ag)

487-S. Nondestructive Testing. Samuel A. Wenk. *Battelle Technical Review,* v. 1, Sept. 1952, p. 98-102.

General introduction and specific methods of testing: light, radiography, magnetic and electric tests, magnetic-particle testing, magnetic analysis, cyclograph, reflection, resonant-frequency, and penetrant tests. (S13)

488-S. Radioactive Isotopes: Their Properties and Uses in the Steel Industry. Graham Oldham. *British Steelmaker,* v. 18, Sept. 1952, p. 460-467.

Relationship to natural radioactive elements, nuclear charge of atom, use of half-life period, detection, counting and particles, history, P in Fe and slag, desulfurization theory, burden transit time, blast furnace-lining wear, segregation in steel, and handling. (S19)

489-S. How Statistical Quality Control Can Help You. D. H. W. Allan. *Canadian Metals,* v. 15, Sept. 1952, p. 48, 50.

Analysis of past data, process control, and sampling inspection. (S12)

490-S. Ultrasonic Detector Reveals Flaws. W. J. Stirling. *Canadian Metals,* v. 15, Sept. 1952, p. 58, 60, 62-63.

Use for testing metallic materials and equipment. (S13)

491-S. The Formulation and Interpretation of Steel Castings Specifications. Edwin Gregor. *Edgar Allen News,* v. 31, June 1952, p. 145-147; July 1952, p. 177-178; Aug. 1952, p. 200-201; disc., p. 201; Sept. 1952, p. 224-225.
(S21, CI)

492-S. Pneumatic Gauging Applied to the Measurement of Surface Finish. M. Graneek and H. L. Wunsch. *Engineer,* v. 194, Sept. 1952, p. 387-389.

Details of a special design of measuring jet suitable for examination of both flat and cylindrical surfaces. Results obtained with pneumatic comparator on a series of ground and turned surfaces having different grades of finish showed that a reasonably linear relation existed between corresponding centerline average readings. (S14)

493-S. Your Quality Control Program—Is It Effective? Kenneth MacKay Smith. *Foundry,* v. 80, Oct. 1952, p. 188, 190, 192-193.

Over-all functions of quality control, rather than detailed technical devices necessary in program's operation. (S12)

494-S. How to Select and Use Films for Weld Radiography. Jay Bland. *Industry & Welding,* v. 25, Oct. 1952, p. 78-82, 148-149.

Film processing, sensitivity, radiation wave lengths, gamma-ray procedure, and weld radiographs of arc welding. Diagrams. (S13, K1)

495-S. Dip and Etch Simplify Aluminum Forging Inspection. Alfred H. Pope. *Iron Age,* v. 170, Oct. 2, 1952, p. 102-103.

Alkaline etch and HNO_3 treatment used at Alcoa's Cleveland plant. Lubricant smut is evenly removed from forging surface to leave a bright finish, but discoloration remains in cracks and discontinuities caused by metal overlapping during forging.
(S13, F22, Al)

496-S. Metallurgical Tips for the Maintenance Man. M. V. Herasimchuk. *Iron and Steel Engineer,* v. 29, Sept. 1952, p. 73-80, disc., p. 81-83.

A few basic principles underlying steel-mill equipment failures show that design factors and metallurgical factors are distinct in their effects, yet often overlap, and that relatively minor design or metallurgical changes will produce effective results. 14 ref. (S21, ST)

497-S. Inorganic Chromatography on Cellulose. Part XII. The Quantitative Determination of Tantalum and Niobium in Complex Minerals, Ores, and Synthetic Materials. A. F. Williams. *Journal of the Chemical Society,* Aug. 1952, p. 3155-3163.

Previously reported method modified to permit Cb to be extracted free from Ti, Sn, and Zr. Tables.
(S11, Ta, Cb)

498-S. A Stoichiometric Combustion Method for the Determination of Sulphur in Slags. C. J. B. Fincham and F. D. Richardson. *Journal of the Iron and Steel Institute,* v. 172, Sept. 1952, p. 53-55.

The slag is melted in a stream of CO_2, and the SO_2 produced is measured. Accuracy claimed is ±2%. Analysis time is 30 min. for both open-hearth and blast-furnace slags. (S11)

499-S. X-Ray Spectroscopy as a Control Method in the Production of Zirconium and Hafnium. D. M. Morti-

more and P. A. Romans. *Journal of the Optical Society of America*, v. 42, Sept. 1952, p. 673-677.

Above analysis made in range of concentrations from 0.5 to 99.5% Hf in Zr. Method makes use of newly perfected X-ray fluorescence analysis equipment incorporating a Geiger tube together with associated scaling and recording circuits for measurement of intensities. Diagram, graphs, and tables. (S11, Zr, Hf)

500-S. An Ultrasonic Flaw Detector for Non-Destructive Testing. *Machinery Lloyd* (Overseas Ed.), v. 24, Sept. 13, 1952, p. 78-81, 83, 85, 87-88.

Transmission and echo sounding methods, indicating relative merits. Details of British apparatus employing latter principle. (S13)

501-S. Where Radioisotopes are Finding Industrial Use. Philip O'Keefe. *Materials & Methods*, v. 36, Sept. 1952, p. 87-89.

Radioisotopes are useful in thickness gages, for wear tests, in radiography corrosion experiments, and in surface-cleaning tests. Brief description of radiation sources and tracers. (S19)

502-S. Measurement of Transient Surface Temperatures. Robert A. Huggins, Bob Roll, and Harry Udin. *Review of Scientific Instruments*, v. 23, Sept. 1952, p. 467-470.

Design, construction, and operation of apparatus to produce, measure, and record transient surface temperature cycle of type produced at and near a typical spot weld. Diagrams and graphs. (S16, K3)

503-S. Strip Width Held to Close Limits. Glenn R. Petersen. *Steel*, v. 131, Sept. 29, 1952, p. 94, 97.

Noncontacting steel mill width gage measures deviations as small as 1/64-in. over a range of 10 to 96 in. Increases tonnage of usable material. (S14, ST)

504-S. New Spectrochemical Excitation Unit: A Key to Essential Control in Boron Steels. J. T. Rozsa and L. E. Zeeb. *Steel*, v. 131, Oct. 6, 1952, p. 92, 94, 97.

Unit provides a rapid, accurate method for determination of boron in trace amounts in alloy steels. Photograph and diagram. (S11, AY)

505-S. Internal Hydrostatic Pressure Testing as a Measure of the Performance Values of Oil Well Casing and Tubing. H. G. Texter. *Third World Petroleum Congress, Proceedings*, Sec. II, 1951, p. 1-19; disc., p. 19-23.

Argues that requirements of A.P.I. casing and tubing specifications do not insure that the products will withstand forces to which they are subjected. Resistance to these forces is expressed as performance values. Compliance with specifications only indirectly proves worth of the product. Only the mill-inspection hydrostatic test is a direct proof of quality, and it does not go far enough. Reasons for believing that defects are not focal points for corrosion. Proof testing of each length is recommended. Typical defects and failures are illustrated. (S13, ST)

506-S. "Cumulative Sampling" Boosts Shop Output 22%. Clyde H. Latter. *American Machinist*, v. 96, Sept. 29, 1952, p. 95-97.

"Cumulative sampling" process at San Diego plant of Solar Aircraft Co. Process control and acceptance sampling are combined in single, easy-to-operate system. Scrap and rework are down 33%. (S12)

507-S. Comparative Specifications for Alloy Steels. *Materials & Methods*, v. 36, Oct. 1952, p. 153, 155, 157.

Lists composition specifications: U. S. military, U. S. Army, U. S. Navy, U. S. Army-Navy aeronautical, and Federal. (S22, AY)

508-S. Sources and Identifying Symbols of Government Specifications. Sherman F. Booth. *Metal Progress*, v. 62, Oct. 1952, p. 109-114.

Principal sources from which specifications may be obtained and identifying symbols used by different agencies. (S22)

509-S. Nondestructive Testing: Quality With Fewer End-Product Failures. Samuel A. Wenk. *Steel*, v. 131, Oct. 13, 1952, p. 158-160, 163.

Surveys various methods used to detect and evaluate defects, or to predict strength and serviceability of parts. Purpose, underlying principles, and limitations. (S13)

510-S. A Semiquantitative Spectrographic Method for the Analysis of Minerals, Rocks, and Ores. C. L. Waring and C. S. Annell. *U. S. Geological Survey* (For U. S. Atomic Energy Commission), TEI-143, Feb. 1951, 23 pages.

The method described determines 55 elements in one arcing of a 10-mg. sample, requires a minimum of sample handling thus reducing chances of contamination, detects low concentrations of elements, and is rapid. It has been used to complete 15,000-20,000 determinations during a 9-month period. (S11)

511-S. A Spectrographic Method for Determining Trace Amounts of Lead in Zircon and Other Minerals. C. L. Waring and Helen Worthing. *U. S. Geological Survey* (For U. S. Atomic Energy Commission), TEI-216, March 1952, 14 pages.

The method is applicable to samples containing 0.5-1000 ppm. Pb with an estimated accuracy of 6-10%. No chemical separations or concentrations are required. Other minerals tested were apatite, spene, microlite, allanite, and perthite. (S11, Pb)

512-S. (Book.) The Measurement and Control of Temperatures in Industry. R. Royds. 260 pages. Chemical Publishing Co., Inc., 212 Fifth Ave., New York 10, N. Y. $5.00.

Latest developments in temperature measurement and control in various industries. Equipment available in each particular range. Standardization and automatic control. (S16)

T

APPLICATIONS OF METALS IN EQUIPMENT

509-T. Booming Market in Steel Windows. *American Lumberman & Building Products Merchandiser*, Sept. 8, 1952, p. 206-207.

"Package window" units. New developments in this field indicate profitable sales. (T26, ST)

510-T. New Material Forms Required for High Speed Planes of the Future. Thomas E. Piper. *Automotive Industries*, v. 107, Sept. 15, 1952, p. 42-45, 114, 116.

Possibility of using synthetic materials in planes of future to replace alloys of Al and Mg. Favorable use of Ti and light-weight steels in these planes. Diagrams. (T24, Al, Mg, Ti, SS, SG-h)

511-T. General Purpose Machines Used to Make Packard Diesels. *Automotive Industries*, v. 107, Sept. 15, 1952, p. 52-53.

Equipment employed for operations on some of major parts of diesel engine. How the job is being done on small-lot basis. Includes a submerged arc welder. (T25, G general, K1)

512-T. Light Weight Packard Diesel. *Diesel Power and Diesel Transportation*, v. 20, Sept. 1952, p. 36-38.

Two light-weight, high-speed engines produced for the U. S. Navy. Al is used in place of cast iron and steel. (T25, Al)

513-T. Technical Facts for Food Processors on Nickel and High-Nickel Alloys. Part II. Metal Data on Brines, Juices, Dressings, Cereals, Vegetables. *Food Engineering*, v. 24, Sept. 1952, p. 95-97, 214. (Condensed from "Corrosion Resistance of Nickel and High-Nickel Alloys in Food Processing", International Nickel Co.)

Also includes corrosion data for Cu, Sn, Zn, brass, bronze, soft solder, mild steel, stainless steel, and Al. (T29, R7)

514-T. Removal of Radioactive Material From Water by Slurrying With Powdered Metal. William J. Lacy. *Journal, American Water Works Association*, v. 44, Sept. 1952, p. 824-828.

Method and procedure on a laboratory scale. Metals evaluated were Fe, Al, Cu, and Zn. Tables. (T29, Fe, Al, Cu, Zn)

515-T. Titanium Dioxide Rectifiers. R. G. Breckenridge and W. R. Hosler. *Journal of Research of the National Bureau of Standards*, v. 49, Aug. 1952, p. 65-72.

The rectifiers utilize a film of semiconducting titanium dioxide produced on titanium metal, prepared either by a two-step process involving a heating of metal in oxygen followed by a reduction of oxide in hydrogen or by a single heating of metal in water vapor. Properties compare favorably with existing types, particularly for high-temperature applications. Properties with regard to nature of counter electrode, and relation to theories of rectification. Tables and graphs. 22 ref. (T1, Ti)

516-T. Building the United States. *Marine Engineering and Shipping Review*, v. 57, Sept. 1952, p. 86-93.

Description of the ship includes notes on use of Al and steel. (T22, Al, ST)

517-T. The Production of Cast Nickel Anodes. Edmund R. Thews. *Metal Finishing*, v. 50, Sept. 1952, p. 70-74, 77.

Production methods to avoid at least a few disadvantages frequently characterizing the cast nickel anode in comparison with other anodes developed for this purpose. Impurities, gas absorption, melting and deoxidizing. 30 ref. (T5, E general, L17, Ni)

518-T. Light Alloy Luxury Yacht Built on Two-Way Tension System. *Metallurgia*, v. 46, Aug. 1952, p. 88.

Largest (60-ft.) all-aluminum yacht ever made in Britain. (T22, Al)

519-T. Light Alloy Roofing at Alexandra Palace. *Metallurgia*, v. 46, Aug. 1952, p. 100.

Use of aluminum. (T26, Al)

520-T. Germanium: Electronics' New Metal. *Modern Industry*, v. 24, Sept. 15, 1952, p. 54-55.

Brief pictorial account of applications. (T1, Ge)

521-T. Plate Making for the Metal Decorator. Joseph W. Mazzaferri. *National Lithographer*, v. 59, Sept. 1952, p. 31.

The metal plates now in use throughout the industry. (T9)

522-T. Cast Iron Pipe Relaid After 143 Years Continuous Use. *Pipe Progress*, v. 37, No. 3, p. 15. (Condensed from Journal of the British Waterworks Association, Apr. 1952).

Condition, composition, and microstructure of the old pipe. (T4, CI)

523-T. Aluminum Advances. *SAE Journal*, v. 60, Sept. 1952, p. 45-51. (Excerpts from "New Applications and Developments in Aluminum Alloys", by J. H. Dunn and E. P. White.)

Brazed castings, plaster and die castings, wiring, finishes. (T21, Al)

524-T. Aluminum for Building. *Architectural Forum,* v. 97, Sept. 1952, p. 152-157.

Al as a basic structural material. Brief comparison data on mechanical and physical properties of mild Al and mild steel.
(T26, Q general, P general, Al, ST)

525-T. Balanced Production at Ryan. *Aviation Age,* v. 18, Sept. 1952, p. 16-18, 23-24.

Production of tubular stainless steel exhaust systems for R-4360-59 Pratt & Whitney aircraft engines. A switch was made from "batch" methods to "flow"-type fabrication. Forming, machining, and spot and seam welding operations.
(T24, K3, G17, F26, SS)

526-T. Better Engine Controls Through Iso-Elastic. *Aviation Age,* v. 18, Sept. 1952, p. 33.

How Bendix Aviation Corp. made use of John Chatillon & Sons' high-Ni iron-base temperature-compensated alloy for calibrated compression springs for transmitters. Table of mechanical properties.
(T8, Q general, SG-b)

527-T. Canadian Stainless for Chemical Industries. John L. Cotsworth. *Canadian Chemical Processing,* v. 36, Sept. 1952, p. 70, 72, 74.

Advances made by Canada in manufacture of stainless steel. Corrosion resistance and mechanical properties. (T29, R general, Q general, SS)

528-T. Production Control of Printed Resistors. W. H. Hannahs and J. W. Eng. *Electronics,* v. 25, Oct. 1952, p. 106-109.

Analysis of factors affecting reproducibility of silk-screened resistors. Steps in manufaoture, rejection rates, process variables, and critical factors. Process involves application of silver to glass. Graphs and photographs. (T1, Ag)

529-T. Carbide Tools Challenge Efficiency of Automatic Screw Machines. C. R. Morgan. *Iron Age,* v. 170, Oct. 2, 1952, p. 97-99.

Motor power, tool-setting facilities, stock loading, chip disposal, tool design, machine rigidity, lubrication, coolants, and inspection which must be considered in order to determine the balance of efficiency between carbide tools and screw machines. (T6, C-n)

530-T. Steel for Forming-Tools. J. Lomas. *Machinery Lloyd* (Overseas Ed.), v. 24, Sept. 13, 1952, p. 69-71, 74.

Main groups of toolsteel for plastic deformation; for shaping and trimming dies; for die-casting dies; and for punches, chisels, and shearing knives. Both hot and cold working steels are considered. (T5, TS)

531-T. Metal Powders in Industry. H. W. Greenwood. *Machinery Lloyd* (Overseas Ed.), v. 24, Sept. 13, 1952, p. 75, 77.

Some lesser known uses and functions of metal powders. Use of Cu brass or bronze for brazing; powdered solder; coatings of Zn or Al on Fe and steel; mixture of magnetic oxide of Fe and Al in welding; and cutting of refractory metal and alloys including stainless steel.
(T5, K8, Cu, Zn, Al, Fe, ST, EG-d)

532-T. New Titanium-Boron Alloy Steel Shows Promise for Jets and Rockets. John L. Everhart. *Materials & Methods,* v. 36, Sept. 1952, p. 96-98.

General description with emphasis on heat treatment, elevated-temperature properties and welding characteristics. It contains 0.022% B, 0.14% Ti, 2.91% Cr and 1.06% Mo. (T25, AY, SG-h)

533-T. Indium Alloys Finding Important Commercial Uses. R. I. Jaffee and S. Marguerite Weiss. *Materials & Methods,* v. 36, Sept. 1952, p. 113-115.

Properties gained by alloying In with Pb, Sn, Cd, or Bi are put to use in bearings, solders, and glass sealing alloys. Graphs and photographs. 10 ref.
(T7, T5, In, Pb, Sn, Cd, Bi)

534-T. Selection, Care, and Maintenance of Wire Rope in Mining. A. J. King. *Mining Congress Journal,* v. 38, Sept. 1952, p. 22-24, 52.

Rules for selection and proper care of wire rope, and information on mechanical properties.
(T28, Q general)

535-T. Aluminum in Heavy Construction. W. C. Devereaux. *Modern Metals,* v. 8, Sept. 1952, p. 28-30, 32, 34-35.

See abstract under similar title, *Metal Industry,* item 491-T, 1951.
(T26, Al)

536-T. Progress Report: Aluminum in Automobiles. J. H. Dunn and E. P. White. *Modern Metals,* v. 8, Sept. 1952, p. 42-43, 45-46, 48, 50-51.

See abstract, "Aluminum Advances", *SAE Journal,* item 523-T, 1952. (T21, Al)

537-T. Magnesium Die Castings in a New Fire Fighting Pump. *Modern Metals,* v. 8, Sept. 1952, p. 58, 60.

McCulloch Motors Corp., Los Angeles, applies principles that made its lightweight chain saw a success to production of a portable fire fighting pump. Brief coverage of casting aspects. (T4, E13, Mg)

538-T. Improved Rock Bit Lowers Drilling Cost in Hard, Abrasive Formations. Lyle L. Payne. *Oil and Gas Journal,* v. 51, Sept. 29, 1952, p. 226, 229.

Use and advantages of the new Hughest R-1 sintered tungsten carbide bit. Tables. (T6, W, C-n)

539-T. New Bit Speeds Drilling in Hard and Brittle Formations. E. G. Boice. *Oil and Gas Journal,* v. 51, Sept. 29, 1952, p. 240, 245.

The Cobra bit which has tungsten carbide inserts embedded in smooth rollers. Performance. (T6, W, C-n)

540-T. Core Materials for Small Transformers. C. C. Horstman. *Tele-Tech,* v. 11, Oct. 1952, p. 40-42, 90.

Use of a magnetic steel, Hipersil, which reduces weight and losses of transformers for magnetic amplifiers and airborne electronic equipment. Special grooving technique increases mechanical rigidity and temperature stability. Photographs, graphs, and diagrams. (T1, AY, SG-p)

541-T. Cobalt: Its Industrial Applications. J. B. Richardson. *Times Review of Industry,* v. 6, Sept. 1952, p. 22-24, 27.

Widespread use of Co in metallurgical, ceramic and other industries. Photographs and tables.
(T general, Co)

542-T. The Use of Porcelain Enamel on Aluminum. Everan C. Woodland. *Ceramic Industry,* v. 59, Oct. 1952, p. 116, 154.

Use of above combination in Navy bulkheads. Future prospects.
(T22, Al)

543-T. Properties of Chemical Engineering Materials of Construction. C. S. Grove, Jr., J. L. Vodonik, R. S. Casey, L. F. Yntema, and W. R. Bekebrede. *Industrial and Engineering Chemistry,* v. 44, Oct. 1952, p. 2371-2380.

Tabulated information on synthetic fibers and less common metals. Coverage of latter is limited to a supplement to 1950's table and deals with molybdenum. 21 ref.
(T29, P general, Q general, Mo)

544-T. How Lead-Clad Steel and Copper Extend Lead Applications. Alfred P. Knapp. *Materials & Methods,* v. 36. Oct. 1952, p. 115-117.

By combining strength, electrical properties, and excellent corrosion resistance, clad metals overcome many disadvantages of Pb used alone. (T general, L22, Pb, Cu, ST)

545-T. Metals in the Jetomic Age. Allen G. Gray. *Steel,* v. 131, Oct. 13, 1952, p. 148-153.

Four different types of materials for ultra-high-temperature service in jet engines: metals and alloys, metals protected with ceramic coatings, ceramic materials, and combinations of metals and ceramics. Photographs and graphs. 12 ref.
(T25, Q general, R general, SG-h)

546-T. Carbon Content Determines Boron Steel Behavior. A. S. Jameson. *Steel,* v. 131, Oct. 13, 1952, p. 154-156.

Use of boron steels in heat treated parts such as springs or axle shafts, which makes possible large savings in Ni and Mo. Present problem is in low-C carburizing and high-C grades. Comparative hardenabilities are charted. (T7, J28, AY)

547-T. Automotive Research. *Steel,* v. 131, Oct. 13, 1952, p. 166-168, 170, 173, 176.

Various research problems of General Motors and Ford Motor Co. laboratories, which include corrosion, substitution of materials, and design for substitute materials.
(T21, R general, A9)

548-T. Applications and Advantages of Cast-Alloy Cutting Tools. Chester M. Adams. *Tool Engineer,* v. 29, Oct. 1952, p. 37-39, 47.

Three types of tool materials are high speed steel, cemented carbide, and cast alloy. Grades available, how to apply cast alloy tools, and selection of cast alloy.
(T6, TS, C-n, Co, SG-j)

549-T. Gallium in Nuclear Reactors; Considerations for Use as a Primary Coolant. R. I. Jaffee, R. M. Evans, E. A. Fromm, and B. W. Gonser. *U. S. Atomic Energy Commission,* AECD-3317, Aug. 1, 1949, 38 pages.

Advantages and disadvantages of Ga and its possible alloys for this use. Most important properties are cross section for neutron absorption, heat-transfer efficiency, melting point, boiling point, and corrosive effect on container metals. Corrosion resistance of W, Ta, Be, and Mo to molten Ga was studied. Conclusion is that Ga and its alloys are unsuitable as primary coolants for nuclear reactors.
(T25, P10, P11, P12, R6, Ga, W, Ta, Be, Mo)

V

MATERIALS
General Coverage of Specific Materials

178-V. Electrolytic Manganese Acceptance Grows. C. L. Mantell. *Iron Age,* v. 170, Sept. 18, 1952, p. 168-172.

Present status of electrolytic Mn, 99.97% pure. Chemical analysis, production, physical properties, allotropism and transition points, properties of alloys, and applications. It is supplied as a cathode chip. 11 ref. (Mn)

179-V. S. G. Cast Irons; Notes on the Properties and Uses of an Important Material. *Automobile Engineer,* v. 42, Sept. 1952, p. 338-340.

See abstract of "The Engineering Properties and Applications of Spheroidal Graphite Cast Iron," A. B. Everest, 4th International Mechanical Engineering Congress, June 1952; item 173-V, 1952. (CI)

180-V. Titanium. *British Steelmaker,* v. 18, Sept. 1952, p. 456-458.

History, production, machining and welding, and prospects. (Ti)

181-V. Tantalum Goes Chemical. *Chemical Engineering,* v. 59, Sept. 1952, p. 252, 254.

Availability, cost, applications, processing, and properties. (Ta)

182-V. New Elektron Magnesium-Zirconium-Zinc-Thorium Casting Alloy ZT1. *Light Metals,* v. 15, Sept. 1952, p. 305-306.

Mechanical properties of above alloy for use at temperatures above 300° C. It is used in sand castings for jet engines. Corrosion resistance, castability, and heat treatment. (Q general, T25, general, E25, J general, Mg)

183-V. Carbon and Low Alloy Steel Castings. Philip O'Keefe. *Materials & Methods,* v. 36, Sept. 1952, p. 119-134.

Properties, specifications, design, joining, heat treating, and inspection. Photographs, tables, and diagrams. (CI)

184-V. Beryllium Alloys in Engineering. Walter Deisinger. *Metal Industry,* v. 81, Sept. 12, 1952, p. 203-205.

See abstract, 4th International Mechanical Engineering Congress, June 1952, item 172-V, 1952. (Be, Cu, Ni)

185-V. Characteristics and Applications of Capped and Rimmed Steels. H. H. Smith. *Wire and Wire Products,* v. 27, Sept. 1952, p. 874-877.

Production, uses, composition, and some mention of welding and plating aspects. (ST)

186-V. How to Understand Brass. Samuel Storchheim. *American Machinist,* v. 96, Oct. 13, 1952, p. 151-156.

Basic metallurgy of brass alloys. Includes constitution, heat treatment, mechanical properties, and corrosion resistance. (M general, J general, Q general, R general, Cu)

187-V. Aluminum Alloys. Harry W. Fritts. *Industrial and Engineering Chemistry,* v. 44, Oct. 1952, p. 2289-2292.

Annual construction-material review. New applications in chemical and petrochemical industries and additional information on resistance to corrosion of aluminum alloys by a number of chemicals. 76 ref. (T29, R general, Al)

188-V. Nickel and Nickel-Base Alloys. H. O. Teeple. *Industrial and Engineering Chemistry,* v. 44, Oct. 1952, p. 2325-2338.

Annual construction-materials review. Composition of alloys, properties of alloys, magnetic properties, high-temperature properties, fabrication including welding, mechanical forming and coating, and applications. 293 ref. (Ni)

189-V. Stainless Steels and Other Ferrous Alloys. Walter A. Luce. *Industrial and Engineering Chemistry,* v. 44, Oct. 1952, p. 2346-2359.

Annual construction-materials review. Corrosion, heat resistance, physical and mechanical properties, welding, and other fabrication means and typical applications. 287 ref. (SS, Fe)

190-V. Less Common Metals. L. F. Yntema and Wilfred R. Bekebrede. *Industrial and Engineering Chemistry,* v. 44. Oct. 1952. p. 2364-2370.

Review of past year's literature on Ta, Ti, Zr, Mo, and the noble metals as construction materials. Properties and applications. 148 ref. (Ta, Ti, Zr, Mo, EG-c)

191-V. Metals for Tomorrow. *Iron Age,* v. 170, Oct. 9, 1952, p. 259-290.

Series of articles on Ce, Ge, Li, Mo, Se, Si, V, Ti, and Zr designed to answer such questions as what is their availability; what are their properties and prospects; where can they be obtained and at what price? Except for Ti the articles are brief and are complete revisions, by the staff of Battelle Memorial Institute, of earlier compilations. The article on Ti is separately abstracted. (A4, T general, EG-d, g)

192-V. Titanium—Our No. 1 Problem. Parts I and II. D. I. Brown. *Iron Age,* v. 170, Oct. 9, 1952, p. 260-279; Oct. 16, 1952, p. 105-113.

Part I: Experimental applications; fabricating methods; forging practice; welding techniques; and machining methods. Economics and a description of the modified Mg reduction process for Ti. Part II: Sources of ore, melting techniques, and casting by skull melting. Tables, diagrams, graphs, photographs, and photomicrographs. Bibliography. (Ti)

193-V. Moly Based Metal Ceramic Designed for High Temperature Use. *Iron Age,* v. 170, Oct. 16, 1952, p. 114.

Physical and mechanical properties. Known as D-1922, and developed by P. R. Mallory & Co., it is a hybrid incorporating Mo disilicide and suitable ceramic components. Potential uses are surveyed. (T general, P general, Q general, Mo, SG-h)

194-V. Materials in Design. *Machine Design,* v. 24, Oct. 1952, p. 125-160.

"Copper-Base Alloys", D. K. Crampton; "Titanium Alloys", Herbert A. Jahnle and Warren S. Hazelton; "Boron Steels", H. B. Knowlton; "Rubber and Synthetics", Karl P. Goodwin; "Magnesium Alloys", James V. Winkler; "Powder Metals", Robert Talmage; "Plastics", John Delmonte; "Aluminum Alloys", John R. Willard; "Corrosion Resistant Materials", Howard T. Francis; and "Heat Resistant Alloys", Roger A. Long. (T general, R general, Cu, Al, Ti, Mg, AY, SG-g. h)

195-V. General Purpose High Temperature Alloys: What They Can Do, Where to Use Them. Kenneth Rose. *Materials & Methods,* v. 36, Oct. 1952, p. 103-107.

Carbon steels, low and high-alloy steels, stainless steels, and nickel-base alloys. Mechanical properties and corrosion resistance. (T general, Q general, R general, CN, AY, SS, Ni, SG-h)

196-V. Manganese-Silicon and Manganese - Nickel - Chromium - Molybdenum Steels. *Materials & Methods,* v. 36, Sept. 1952, p. 139.

Materials data sheet on AISI Types 9255, 9261, 9440, and 9450 steels. Physical and mechanical properties, heat treatment, fabricating properties, corrosion resistance, available forms, and uses. (AY)

197-V. The Metallurgy of Zirconium. Its Extraction, Fabrication and Properties. (Concluded.) A. D. Merriman. *Metal Treatment and Drop Forging,* v. 19, Sept. 1952, p. 413-417.

Workability of Zr metal. Corrosion properties and potentialities of Zr as an alloying element. Some present-day applications. 23 ref. (Zr)

198-V. (Book.) The Magnesium Symposium. 64 pages. PB 106 332, Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $2.00.

A handbook on industrial application of magnesium alloys. Contains report of a symposium held at Army's Engineer Research and Development Laboratories (Fort Belvoir) in cooperation with Magnesium Assn. (T general, Mg)

199-V. (Book.) Aluminiumguss in Sand und Kokille. (Sand and Die-Cast Aluminum Castings.) Ed. 5. Roland Irmann. 300 pages. Verlag der Aluminium-Zentrale E. V., 31 Alleestrasse, Düsseldorf, Germany. Bound, 30.60 D.M., paper backed, 28.20 D.M.

Raw materials; Al and alloys: smelting of swarf; silicon alloys, gas porosity, volume changes, melting practice, casting. foundry practice, die-casting, cleaning. anodizing, heat treatment, inspection, and welding. (E11, E13, Al)

EMPLOYMENT SERVICE BUREAU

The Employment Service Bureau is operated as a service to members of the American Society for Metals and no charge is made for advertising insertions. The "Positions Wanted" column, however, is restricted to members in good standing of the A.S.M. Ads are limited to 50 words and only one insertion of any one ad. Address answers care of A.S.M., 7301 Euclid Ave., Cleveland 3, O., unless otherwise stated.

POSITIONS OPEN

East

METALLURGIST: With sales or engineering contact experience. Familiar with stainless steel bars, sheets, tubes, etc. Will be required to travel in eastern states. Position is with large eastern stainless steel distributor. Write giving age, qualifications, salary expected, etc. Box 11-10.

METALLURGIST: Experimental work in high-temperature metallurgy using powder metal techniques. Facility in technical German essential. United States citizenship desired. Unusual opportunity. Box 11-15.

SENIOR METALLURGIST: Five to ten years experience. Responsible for continuing development of new, promising high-temperature alloy. Experience in vacuum techniques and metallography helpful. Good salary and opportunity. Box 11-20.

METALLURGIST: With sales experience. Familiar with stainless steel pipe and tubing, thorough knowledge of process piping systems in chemical plants, required by large eastern distributor. Some traveling in eastern states necessary. Write giving age, qualifications, salary expected. Box 11-25.

METALLURGIST: With thorough knowledge of toolsteels and their applications, specialty steels and alloys. Promising opportunity for man 28 to 36 years old with ability to warrant further advancement. Location New York State. Give full information, age, education, experience in first letter. Box 11-100.

Midwest

METALLURGIST: Recent graduate wanted by Pittsburgh bar and tubing fabricator. Laboratory and processing control and metallurgical contact involved. Good future for one with initiative. Give age, education, experience and salary expected. Our personnel know of this advertisement. Box 11-30.

METALLURGICAL ASSISTANT: Opening in metallurgical department of large midwest automotive parts manufacturer. Prefer recent college graduate interested in production and process metallurgy. Write stating age, school, salary expected. Box 11-35.

SUPERVISOR, FOUNDRY RESEARCH: Excellent opportunity for experienced foundry metallurgist to organize and direct an important program in foundry research. Graduate study in this field or equivalent and practical experience necessary. Interest in and knowledge of modern research methods highly desirable. Permanent position in outstanding research laboratory offers unusual opportunity for personal and professional advancement. Salary commensurate with qualifications. Box 11-40.

METALLURGIST: The Cornell Aeronautical Laboratory, Inc., requires metallurgist with degree. Experience in fatigue research and good grades are required. Would participate in high-temperature metallurgical research. Write: William S. Diefenbach, Employment Office, Cornell Aeronautical Laboratory, Inc., P.O. Box 235, Buffalo 21, N. Y.

LITERATURE METALLURGIST: Needed to assist in interpreting and correlating literature on the constitution of binary alloy systems. Reading knowledge of German and French desirable. Outstanding opportunity to work closely with recognized leader in field and to contribute to book highly essential to field. Work will lead to permanent literature metallurgist or research metallurgist position. Send complete resume to: Assistant Director for Personnel, Armour Research Foundation of Illinois Institute of Technology, Chicago 16, Ill.

METALLURGIST: For large midwest forge shop. Degree in metallurgy plus minimum of five years experience in alloy and stainless steels, in forging or related industry. Attractive permanent opportunity. Box 11-45.

TOOLSTEEL SALESMAN: Young man with experience for Chicago and surrounding territory. Straight salary. Advise qualifications. Box 11-105.

West

METALLURGICAL PERSONNEL: Several openings in the metallurgy and inspection department at the Pittsburg (California) Works of Columbia-Geneva Steel. Jobs require university graduates with degrees in metallurgy or the equivalent in education and/or experience (chemical engineer, chemist, etc.) Starting rates are: $326-metallurgical trainees; $346-specification analysts; $366-metallurgists. Automatic $20 increases at end of six months. Operations include openhearth, rolling mills, rod mills, wire, nail and wire rope mills, sheet and tin mills, and a foundry to begin operating soon. Please write directly to: G. H. Carr, Personnel Supervisor, Columbia-Geneva Steel, Division of U. S. Steel Co., Pittsburg Works, P.O. Box 471, Pittsburg, Calif.

ANALYTICAL CHEMIST: Young man for production control and research analytical laboratories. Nonferrous experience desirable but not essential. Laboratory performs varied organic and inorganic analysis. Position offers excellent opportunity with expanding organization. In reply furnish information concerning personal history, background and training, and state salary requirements and enclose recent photograph if available. Write: Employment Supervisor, Kaiser Aluminum & Chemical Corp., Trentwood Works, P.O. Box 1451, Spokane, Wash.

POSITIONS WANTED

METALLURGICAL ENGINEER: M.S. degree, age 26, married, one child. To be released from Air Force in January. One year experience in corrosion research laboratory and 1½ years experience in government research and development laboratory evaluating substitute steels and investigating parts failures. Desires position in iron or steel research and/or development or production. Box 11-50.

METALLURGIST: Non-citizen. M.S. degree, age 35, married. Experienced in rolling mills and ten years in heat treatment of ferrous and nonferrous metals. Capable of doing metallographic work and trouble shooting. Presently chief metallurgist in Hindustan Motors, Calcutta, and responsible for hardening shop and main laboratory. Seeks job in metallurgical laboratories in automobile concern. Box 11-55.

EXECUTIVE METALLURGIST: Production, research or sales. B.S. degree, age 41. Twenty years diversified experience in all phases of manufacture, processing, fabrication and sales engineering of alloy and special steels, including 12 years with corrosion and heat resistant grades. Outstanding record of accomplishment. Proven administrative ability, technical writer, and consultant. Wide knowledge of quality control methods. Box 11-60.

METALLURGICAL ENGINEER: Age 36, single, B.S. degree, forced to give up metallurgical career soon after graduation because of illness, now desires to make comeback as ferrous metallurgist. Not experienced, but attained outstanding scholastic record, and up-to-date on metallurgical developments. Desires Pennsylvania location. Box 11-65.

METALLURGICAL ENGINEER: B.S. degree in metallurgical engineering. Two years experience as metallurgist in laboratory investigations of ferrous and nonferrous metals in regard to failures and manufacturing problems. Box 11-70.

METALLURGIST: M.S. degree, veteran. Three years research laboratory experience, mainly with high-temperature properties of copper-base alloys. Diversified experience in tube mill of refining, casting, piercing, extrusion and drawing processes. Desires position in research, development, or production. Box 11-75.

METALLURGIST: M.S. degree, 28 years old, married, no children. Education and experience include heat treatment of ferrous metals, corrosion research in all types of aircraft materials, and extensive experience with titanium. Desires sales service or research position with aluminum or alloy steel company. Prefers California or southern location. Box 11-80.

METALLURGICAL ENGINEER: Graduate. Eight years research development, production and supervisory experience in metallurgical field, including production of tungsten powder metal alloys and induction melting of stainless and superalloys for remelting. Age 30. Desires position with management possibilities. Presently employed. Box 11-85.

RESEARCH METALLURGIST: Ph.D. with physical chemistry background. Age 37, family. Canadian. Fifteen years experience in integrated steel plants. Held positions as assistant chief metallurgist, director of research and development. Broad research and practical experience in ferrous metallurgy and byproducts. Box 11-90.

METALLURGICAL ENGINEER: Technical service. B.S. in metallurgy, age 35, married. Five years experience in technical service-sales, customer complaint and contact work in welding and metallurgy. Six years of development, procedures, specifications in ferrous metallurgy, welding, and as member of steel mill metallurgical staff. Considerable public speaking before technical societies, plant staffs, and sales meetings. Published technical articles, taught college metallurgy. Box 11-95.

METALLURGICAL ENGINEER: M.S. degree, twenty five years diversified experience in metallurgical research and investigation in plant and laboratory. Broad background in heat treatment, metallography, physical and mechanical testing, service failures, quality control, analysis of data, foundry work. Desires position where accumulated experience can be used to organize, supervise and prosecute investigational work of research or practical nature. Box 11-110.

MOLDER: Dutch, speaks English. Education and experience in electric welding, molding, and wire-drawing. Eight years experience in Dutch propeller manufacturing concern. Desires position in U. S. as a molder. Box 11-115.

Inland Empire Greets New Chairman

Inland Empire Chapter's 1952-53 Chairman, S. A. Duran, Assistant Professor, State College, Washington, Presents His Predecessor, L. J. Barker, Metallurgist, Kaiser Aluminum & Chemical Corp., With Chairman's Certificate, As Officers for the Coming Year Were Greeted During the May Meeting

STATEMENT OF THE OWNERSHIP, MANAGEMENT AND CIRCULATION, REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912, AS AMENDED BY THE ACTS OF MARCH 3, 1933 AND JULY 2, 1946 (39 U. S. C. 233), OF METALS REVIEW

PUBLISHED MONTHLY AT CLEVELAND, OHIO

FOR OCTOBER 1, 1952

1.—The names and addresses of the publisher, editor, associate editor, and business manager are: Publisher, American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio; Editor, M. R. Hyslop, 7301 Euclid Ave., Cleveland; Associate Editor, Betty A. Bryan, 7301 Euclid Ave., Cleveland; Business Manager, W. H. Eisenman, 7301 Euclid Ave., Cleveland.

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Marjorie R. Hyslop, Editor

Sworn to and subscribed before me this 1st day of October, 1952. (Seal) Genevieve G. Fitzgerald, Notary Public. (My commission expires March 26, 1955.)

CHAPTER MEETING CALENDAR

CHAPTER	DATE	PLACE	SPEAKER	SUBJECT
Baltimore	Dec. 16	Engineers Club		Hopkins Night
Boston	Dec. 5	Hotel Shelton	A. O. Schmidt	Milling Practice
British Columbia	Dec. 4	Stanley Park		Film Night
Buffalo	Dec. 4	Sheraton Hotel	R. D. Stout	Joint Meeting With A.W.S.
Calumet	Dec. 9	Phil Smidt	Max Hansen	Titanium Phase Diagrams and Alloy Development
Canton-Massillon	Dec. 2	Mergus Restaurant	S. S. Rice	Cold Forming and Heat Treatment of Steel Cartridge Shells
Chicago	Dec. 8	Furniture Club		Christmas Party
Cincinnati	Dec. 11	Engineering Society Headquarters	J. B. Johnson	Heat Resisting Alloys
Cleveland	Dec. 1	Hollenden Hotel	R. Livingstone	Management's Three Greatest Errors
Columbia Basin	Dec. 13	Desert Inn		Christmas Party
Columbus	Dec. 3	Battelle Memorial Institute	G. Roberts	National Officers Night
Dayton	Dec. 10	Engineers Club	Ben Alexander	Diffusion Mechanism in Metal Sintering
Detroit	Dec. 8	Elmwood Hotel		Christmas Party
Eastern New York	Dec. 9	Bohemian Tavern		Christmas Party
Hartford	Dec. 5	The Hedges, New Britain		Christmas Party
Indianapolis	Dec. 15	McClarney's Restaurant	F. O. Jagels, Jr.	Synthetic Gems
Inland Empire	Dec. 12	Spokane Hotel		Christmas Party
Kansas City	Dec. 17	Garrett Hall		Christmas Party
Lehigh Valley	Dec. 5	Hotel Traylor, Allentown	J. R. Vilella	Metallographic Techniques
Los Alamos	Dec. 13			Christmas Party
Louisville	Dec. 2	Korfhage's Tavern	L. P. Tarasov	Grinding
Milwaukee	Dec. 5	North Hills Country Club		Stag Party
Minnesota	Dec. 12	Athletic Club		Christmas Party
Montreal	Dec. 1	Queens Hotel		Film Night
New Haven	Dec. 19	Hammond Laboratory		Christmas Party
New Jersey	Dec. 15	Essex House Hotel		Annual Christmas Smoker
New York	Dec. 8	Hotel New Yorker	A. W. Calder, Jr.	Shell Molding
Notre Dame	Dec. 10	Engineering Bldg.	W. S. Pellini	Factors Which Determine Brittle Failure of Weldments
Oak Ridge	Dec. 13	K. of C. Hall		Christmas Party
Ontario	Dec. 5	Roval Connaught Hotel, Hamilton	H. B. Knowlton	Steel Selection for Conservation
Oregon	Dec. 12	Congress Hotel		Christmas Party
Ottawa Valley	Dec. 2	Physical Metallurgy Research Labs	I. E. Puddington	Lubrication of Metals
Penn State	Dec. 9	State College	G. A. Roberts	High Alloy Toolsteels
Peoria	Dec. 8	Morton, Ill.	E. F. Lundeen	Rolling and Forming of Sheet Steel
Philadelphia	Dec. 5	Penn Sheraton		Winter Frolic
Pittsburgh	Dec. 5	Schenley Hotel		Christmas Party
Puget Sound	Dec. 10	Engineer's Club, Seattle		Christmas Party
Purdue	Dec. 16	Purdue Union	J. H. Holloman	Defects-Diffusion-Distortion
Rhode Island	Dec. 3	Providence Engineering Society	G. Galler	Stainless Steel Trends
Rochester	Dec. 8	Howard Johnson's	T. A. Pruger	Stainless Substitutes for Chrome-Nickel Stainless Steels
Rockford	Dec. 17	Faust Hotel		Christmas Party
St. Louis	Dec. 12	Congress Hotel		Christmas Party
Syracuse	Dec. 2	Onondaga Hotel	Ellis Verink	Aluminum in the Chemical Industry
Toledo	Dec. 13	Maumee River Yacht Club		Christmas Party
Tri-City	Dec. 2		L. C. Bibber	Welding of Structural Steel
Tulsa	Dec. 2		F. W. Boynton	Aluminum and its Alloys
Utah	Dec. 13	Newhouse Hotel		Christmas Party
Washington	Dec. 8	Naylor's Restaurant	V. Malcolm	Fabrication of Steam Piping Systems (Joint Meeting With A.W.S.)
Western Ontario	Dec. 12	London		Christmas Party
West Michigan	Dec. 15	Elks Club, Grand Rapids		Panel Program
Wichita	Dec. 16	K. of C. Hall		Christmas Party
Worcester	Dec. 10	Hickory House	M. F. Judkins	Machinability of Metals
York	Dec. 10	Lancaster	Arnold Seasholtz	Selection and Application of Steel

15 TYPES
INDUSTRIAL POT FURNACES . . .
GAS - OIL - ELECTRIC.
SALT BATH CONVEYORS.

HOLDEN
METALLURGICAL PRODUCTS
TRADE MARK REGISTERED

50 SALT BATH
COMPOSITIONS FOR ANY
HEAT TREATING APPLICATION.
BLACKING BATH.

ADDITIVES—VERSUS—RECTIFIERS

The benefits of the new combinations of salt baths containing additives can be summarized briefly as follows:

1. **The additives do not create sludges, but rather act to neutralize alkalies.**
2. **Further, the additives react with metal oxides which cause decarburization and sludge to decompose these oxides either partially to gases, or to complete reaction which is approximately the same specific weight as the salt compound. This therefore eliminates sludges, except for contamination from fixtures.**
3. **Additives in the high temperature baths, when used for hardening high speed steels, whether with inconel or chrome electrodes, keep the electrodes clean, preventing attack at the grain boundaries and further convert the chrome oxides to pure metallic chrome.**
4. **The use of these additives, therefore, plays an important part in maintaining the fluidity of your salt bath and lengthening the life of the electrodes. Also, these salt baths which have additives in them, when used in alloy pots, react with alkalies and metal oxides, nullify the effects at the grain boundaries of the alloy pots.**
5. **These products—Hardening 185-10, Hardening 127-11, Hardening 127-12, Hard Brite AA-10, High Speed Preheat 13-17-10 and High Speed 17-24 AA-10—will increase electrode life, ceramic and alloy pot life.**
6. **Holden Salt Baths can be used in any type of competitive furnace. We will assume manufacturer's guarantee with any proven design.**

WRITE FOR DETAILS!!

If you are having trouble with sludging, short electrode life, short alloy pot life, your initial order for Holden Salt Baths should clearly demonstrate the improvements which can be effected in your operating department.

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